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Handbook of Information for the Hard of Hearing

COMPILED AND ARRANGED BY

CHARLES G. BLUETT
Bureau of Vocational Rehabilitation
State Department of Education

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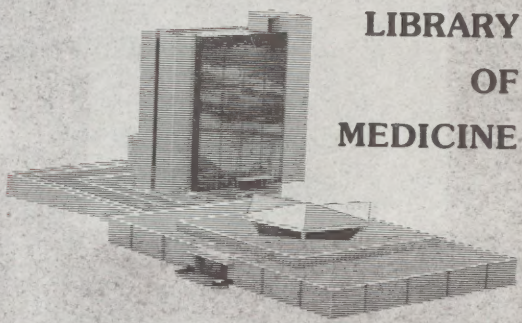

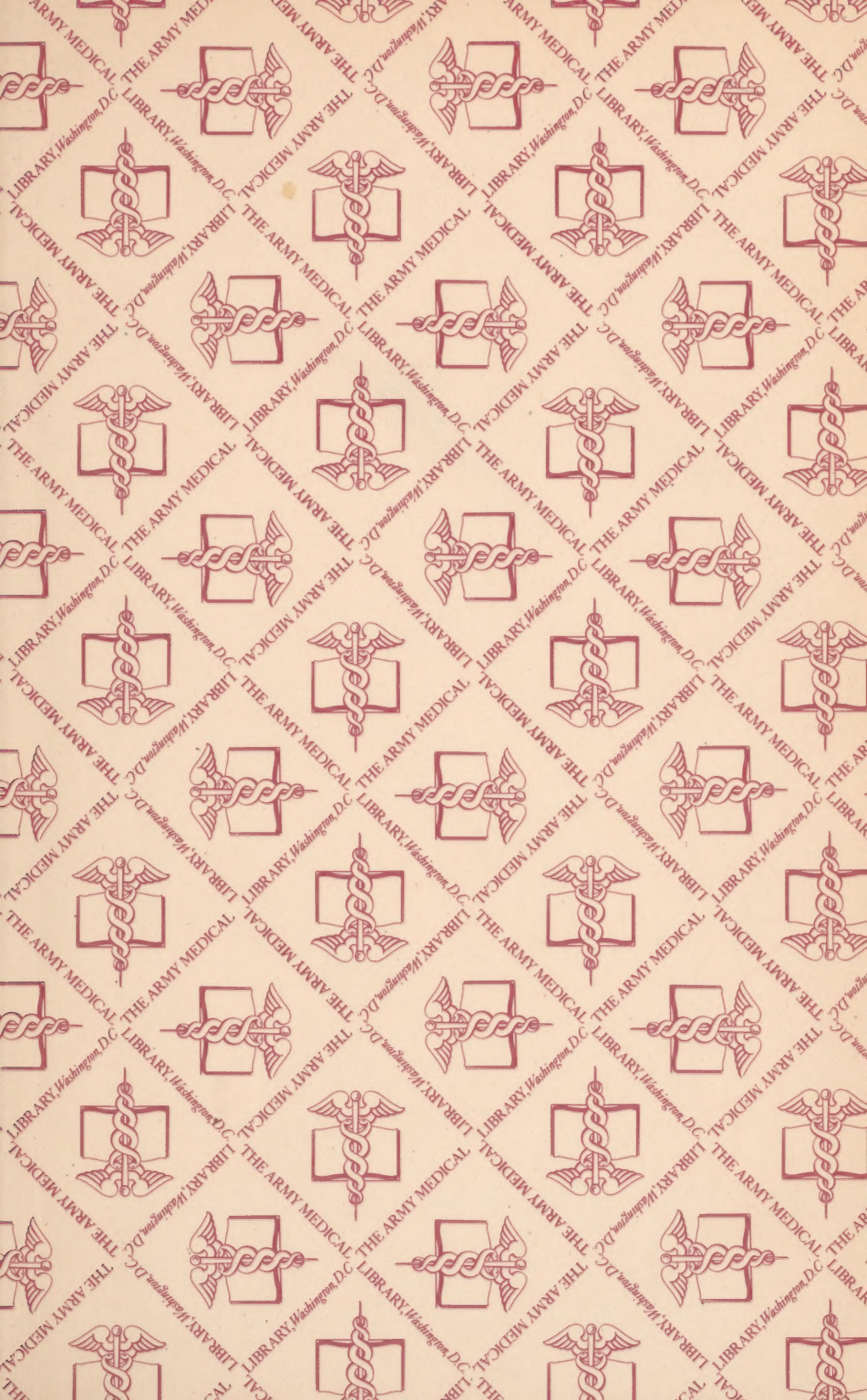
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HANDBOOK OF INFORMATION

FOR THE

HARD OF HEARING

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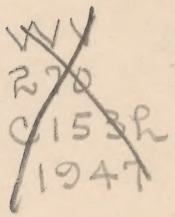

Dedicated
To GEORGE E. COLEMAN
Whose Life Symbolized the Continuing
Fight to Eradicate Deafness

printed in CALIFORNIA STATE PRINTING OFFICE

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FOREWORD

Life involves a series of adjustments, and the facility with which a person makes a satisfactory adaptation to new environment or changed conditions determines to a considerable extent his social and economic success.

Adjustment to radically changed circumstances is never an easy process. When the situation is complicated by the presence of a physical impairment, the process may be even more difficult, and special aids may be required. Fortunately such assistance has been made available by enlightened public policy, in the way of remedial and health services, special education facilities and vocational rehabilitation service.

An additional aid to the hard of hearing is this publication. In it is authentic information concerning the various phases of the problem of defective hearing. In it are suggestions for the solution of the difficulties that the hard-of-hearing person may encounter. It is hoped that it may serve as a useful guide and as an aid to any necessary adjustment that will bring to the hard of hearing the attainment of a greater measure of the satisfactions of life and living.

Roy E Simpson

State Superintendent of Public Instruction

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PREFACE

This publication is the result of a widespread and urgent demand created by the publication in 1942 of its predecessor, "Handbook of Information for the Hard-of-Hearing Adult." That handbook met with such an enthusiastic reception that the edition was soon exhausted. The volume of orders and requests for copies since received is assurance to the sponsors and authors of public approval and appreciation.

Part I of the current publication is a revision and amplification of the original handbook. To it has been added Part II with new material pertaining to the hard-of-hearing child. This was done because it was found that in addition to serving its primary purpose of advising the hard-of-hearing persons to whom it was addressed, it also had been widely sought by agencies and individuals dealing with the hard of hearing for use in providing services. It was even used as a textbook by many educational institutions.

Charles G. Bluett, Assistant District Supervisor, State Bureau of Vocational Rehabilitation, again undertook the task of compilation, arrangement and revision. He was ably assisted by Donald D. Caziarc, Hearing Conservation Specialist, California State Department of Public Health, and former Aural Rehabilitation Officer, Hoff General Hospital. Special credit is also due to Dr. Elwood A. Stevenson, Superintendent of the California School for the Deaf, who reviewed various sections of the handbook and made many valuable suggestions for its improvement. To them and to the authors of the various sections who contributed so liberally of their time and of their knowledge, the most sincere appreciation is expressed. Theirs is a contribution that cannot fail to result in material benefit to every hard-of-hearing person and to every person dealing with the hard of hearing who may read these pages.

HARRY D. HICKER
Chief, Bureau of Vocational Rehabilitation

CONTENTS

CONTENTS—Continued

CONTENTS—Continued

PART II

HEARING CONSERVATION AND THE HARD-OF-HEARING CHILD IN CALIFORNIA

CONTENTS—Continued

Part I

INFORMATION REGARDING THE HARD-OF-HEARING ADULT

MEDICAL ASPECTS OF IMPAIRED HEARING

Harold A. Fletcher, M.D., *San Francisco*

The Hearing Mechanism

When we think of our ears and our ability to hear, we often make the mistake of thinking of the hearing mechanism as a separate instrument like a watch which we can take from our pocket, detach from its chain, and send to the watchmaker for cleaning and oiling, repairing, or reconstruction. This would be wonderful, if true, but unfortunately our hearing mechanism is an integral part of our body. Conversely, the health of the ears often has a great and far-reaching effect on the health of the rest of the body physically, nervously, and spiritually. Our ears are very special mechanisms, and they are deeply placed in vital parts of the head, surrounded by other important structures, fed and nourished by the same blood that goes to the rest of our system, with an air inlet or connection with the nose and subjected to the same misfortunes of injuries and diseases as are the other parts of the body.

Most of us know today something of the anatomy and structure of the ears, since so much has been said and written about it. We know we have the external ear which is a megaphone to catch sound waves. This leads into a canal the size of a small lead pencil and about one and a half inches long, ending at the drum membrane. The drum membrane is a thin parchment paper-like membrane behind or beyond which is a small cavity about the size of a small, flat almond. This is the middle-ear cavity; it is filled with air which is replenished from the air breathed into the nose by a small tube about one and a half inches long, the Eustachian tube. The air cavity of the middle ear also extends backward and connects with a group of air spaces in the bone behind the ear, the mastoid cells. Thus air entering the nose can go up into the middle-ear cavity and back into the mastoid cells. This is important, as the normal or healthy airing of these cavities and the maintenance of equal atmospheric pressure are important for good hearing.

Stretching across the middle-ear cavity is a chain of very small delicate bones jointed together to form a springlike chain. The first bone is attached to the drum, and the last or third bone has a flat base which fits as a flat piston into an oval opening into another inner cavity, the *inner ear*. These small bones, no larger than small links in a watch chain, are so arranged and so jointed that they transmit any vibration of the drum membrane. Every sound coming through the air is a real movement of air in waves, and every type of sound we hear has a certain shape or pattern of its air wave. The drum picks

up this pattern and transmits it to the small chain of bones of the middle ear which carry it along to the oval window where the last or third bone fits as a delicate piston. The vibration of this piston transmits the pattern of sound wave to the inner ear.

The inner ear is filled with a thin fluid which is set in vibration also according to the pattern of the sound waves. In this fluid is suspended the inner-ear mechanism which is shaped like a small, spiral sea shell. This is very small, taking up only the space of a tiny hazelnut kernel. Yet in this cavity is a spiral membrane like a staircase with several million delicate steps from base to apex. Each step might be likened to a piano key. When sound waves come into the ear, vibrating the drum and small bones and finally the fluid in the inner ear, the vibration of the inner-ear fluid vibrates certain of these steps or keys which in turn set up nerve impulses or electric currents which go to that part of the brain with which we hear. Each one of these steps or keys in the inner ear has several fine nerve cells, and from each of these goes a nerve fibre or wire. All of these nerve fibres are collected into a cable which is the nerve of hearing. As there are several million of these nerve cells and their wires all in such a small space, it is a very complicated and delicately formed mechanism.

All of these structures, external ear, middle ear, bony chain, inner ear, nerve cells, nerve cable, and brain cells are made up of living, breathing cells. None of them is dead or inert. They must have air, oxygen, food, water, in the proper amounts, or they suffer and waste away and die. When one considers all of these points, he may comprehend how much more difficult it is to find out what part has been damaged and why, than in the case of a broken watch or a radio; also he will understand the difficulty of correcting the fault. If parts of the root system of a delicate plant die, and if the leaves are attacked by parasites, some can be saved and rejuvenated by proper nourishment, sprays, and soil, if action is taken in time. Similarly, some of the various troubles in the ear can be corrected if recognized and cared for in time. The ear is complex and delicate, and it is remarkable that so much is known about such a delicate mechanism. Notwithstanding all that can be done for the hearing mechanism, however, we are still unable to prevent or cure many of its troubles which we still do not understand.

Kinds and Causes of Hearing Loss

There are many forms and degrees of impaired hearing. For simplicity they can be put into main groups according to the parts affected. Thus we speak of two main forms, the conductive impairment and the perceptive impairment.

The conductive type of deafness is so called because it is due to blockading of the physical sound waves in the external ear, the canal, the drum, or the middle-ear structures as far as the inner ear. This obstruction to sound waves may be caused by anything from wax or foreign material in the canal to disease processes that destroy the drum and the small bones of the middle ear. The chief causes, however, are changes in the thickness of the ear drum, the joints of the small bones of the middle ear, and the lining membrane of the walls of the middle ear and Eustachian tube. These changes come about from head colds, obstruction to nasal breathing space, adenoids, deviated septum, enlarged turbinates, polypi, acute and chronic sinus infections, and allergy. Under such conditions the middle ear is not properly aerated so that the air pressure inside the drum is different from that of the outside air. Infections in the nose, sinuses, and throat extend into the middle ear through the Eustachian tube, causing middle-ear abscess and destruction of the drum and middle ear, and even of mastoid bones. The scars and thickenings that remain after these abscesses heal obstruct the sound also. All of these are local troubles; and impairment of hearing is prevented or cleared up by attention to these local causes in the nose, throat, and ears. Sometimes, however, local troubles in the nose and throat are caused or aggravated by a more general illness, by improper general hygienic conditions, or habits of diet and living, and these must be corrected, of course.

One form of conductive deafness begins at or near birth and is progressive, but is seldom recognized until later. It is a slow-growing insidious disease without pain and with few symptoms. The cause of this disease may be in the faulty chemistry of the body; it may be due to glandular disturbances, or vitamin deficiencies, or other reactions. The result is a progressive thickening in the lining membrane of the middle ear.

There is one special form of conductive deafness usually beginning in young adults between fourteen and thirty years. This is called otosclerosis. It is often a very severe form of deafness, usually affecting both ears, sometimes progressing very rapidly. The cause of the deafness is an abnormal formation of bone in the piston-like connection of the inner ear. It fixes this junction rigidly so that no vibration gets through to the fluid of the inner ear. The cause of this abnormal bone formation is not yet known, but probably is connected in part with the reproductive glands and possibly with the effect of some vitamins.

The second main type of deafness is the perceptive type. This is so named since it is a disturbance or a destruction of parts of the inner ear where the physical sound wave vibrations are converted into nerve impulses somewhat in the same way as sound is converted into electric impulses in the telephone mouthpieces and carried to a distant place where it is perceived or

heard. The mechanism in the inner ear or cochlea is very complex and delicate and easily injured. Loud sounds and severe head injuries can cause a derangement of these fine structures. Changes in the delicate blood vessels bringing nourishment to the delicate parts, or poisons or impurities in the blood itself can cause them to grow weak or cease to function either in small areas or large. The lower turn of the spiral cochlea is the most important part. It is in such close proximity to the middle ear that chronic or even acute infections of the middle ear as well as changes in the blood vessels and poisons brought through the blood vessels can also affect the inner ear.

There are a great number of things which can cause degeneration of the nervous elements of the inner ear—the nerve endings, and the delicate nerve fibres which go from the cochlea to the brain. The very fine arteries may get smaller through disease or changes due to age (arteriosclerosis); the veins taking blood away may become obstructed either in or near or at some distance from the cochlea. Both of these conditions may cause a change in the pressure and nourishment and be detrimental to the inner ear and its function. The blood itself may not have sufficient or proper elements to keep the inner-ear structures healthy; thus anemia, lack of proper minerals, food elements, vitamins, or glandular substances may cause degeneration. Poisons taken in drugs such as quinine, salicylates, of which aspirin is the more commonly used, alcohol, nicotine, poison gases and vapors and many others may and do cause degeneration of nerve elements in the inner ear. Other poisons generated in the body itself from fatigue, and not properly eliminated, form a host of substances which may play a part. We do not know the names or combinations of many of these, but we do know they exist. Poisons secondary to illnesses such as typhoid, scarlet fever, mumps, syphilis, influenza, and many others often cause marked degeneration of the inner ear and at times complete deafness. Chronic infection from sinuses, tonsils, teeth, and other parts may be very serious. Not all people, however, are affected in the same way or to the same degree by these poisons; and also different organs and structures in one person's body are more susceptible to trouble than other parts.

Commonsense Rules to Promote Hearing Health

From the foregoing description of some of the causes of hearing loss, we can draw certain conclusions as to the symptoms to be watched for and the course to be taken if there appears to be any decrease in our own hearing ability or the hearing ability of children. Children particularly should be watched and should have their hearing tested from time to time, for it is in childhood that a great many cases of later deafness begin. Attention to their general health and hygiene and diet and habits should be careful and intelligent. Children with frequent head colds, running nose, tonsillitis, and those

who are mouth breathers, should have these conditions cleared up as soon as possible. Discharging ears or earache should receive the immediate attention of a physician, and if possible, a specialist. The ears should be carefully watched during and after certain acute infections such as measles, mumps, scarlet fever, acute head colds accompanied by high fever, typhoid, diphtheria, and others. Apparent inattention on the part of a child when spoken to in school or at home should always suggest ear trouble and loss of hearing. This inattention may come and go for shorter or longer periods, but should not be overlooked.

In later childhood and in early adult stages the same observations apply. Overfatigue, poor hygienic surroundings, bad habits, chronic or repeated overfatigue, bad ventilation of surroundings, improper diet, overindulgence in drugs, alcohol, or nicotine, may be contributing factors to later impaired hearing. The most important thing to remember is not to neglect warning conditions that may lead to loss of hearing. If it is possible, a good physician or better, a specialist, should be consulted, as later deafness may be avoided if the trouble is properly diagnosed and corrected in its early stages. If this is impossible, the person should give a certain amount of intelligent thought to his health and that of his children, always keeping in mind general commonsense rules and regulations. There are certain fundamental do's and don't's to be remembered. To list these in detail would take too much space, but the following list of suggestions may help whether a physician is consulted or not.

Noises

High, shrill, loud noises may cause deafness and tinnitus; therefore, keep away from them. Popping paper bags, blowing a horn, or shooting a popgun close to a person's ear (even a loud scream in a person's or baby's ear) may cause irreparable damage. I remember a boy who used to make a sudden scream in his four months' old sister's ear to see her excitedly wave her arms and legs and shudder. I shudder now as to what that girl's hearing is today. Never box anyone's ears, for many ruptured eardrums have resulted. Working or playing in continuous loud noise over a period of time will always create some loss of hearing.

Cleaning the Ears

Never use any instruments such as hairpins, toothpicks, or wax spoons to clean your own or others' ears. "Never put anything but your own elbow in your own ear," is a good old proverb. Injuries to the canals and drum often result. Clean the entrance with a clean wash cloth. Do not use soapy water, as it often causes itching ears and eczema of the ears. If necessary to get dirt

out of the canal, or even wax, very gentle syringing with salt water with a soft rubber ear syringe may be advisable, but here again it is better done by a doctor or at least a trained nurse. Do not use patent medicines or other drugs in the ears. They seldom do good, and often do harm.

Blowing the Nose

This is a habit which has caused more ear trouble, deafness, abscessed ears, and mastoid infections than any other one mistake. Parents still urge their children with running noses and head colds to blow the nose and "blow it hard!" Many adults are continually blowing their own noses, sometimes like a steamboat whistle. Some people suffer no ill effect for years, but many others lose their hearing or even their lives by so doing.

There is no safe way to blow one's nose. If one side of the nose is stopped up and one side open, and the person closes the open side and blows, the pressure backs up and often opens the Eustachian tubes, and as the air passes out into the middle ear it carries discharge from the nose to the middle ear and sets up inflammation there. It may be necessary at times to clear the nose by blowing, but it is never absolutely safe. When necessary, it should be done gently with the face down so that discharge can flow out by gravity as well as with the help of gentle blowing. Have the face parallel with the floor, and blow gently and repeatedly, taking several minutes to clear the mucus out. Never try to clear it by one or several loud blows. Never completely stop both nostrils. Often, just putting the nose down, as in lying on one's stomach and gently breathing out, will clear the nose gradually and completely, if a little time and patience are used. It is safer and better to blow the nose "backward," by lying flat on one's back and snuffing backward until gradually the nose is cleared into the throat. Most people are too impatient to take the trouble, and they do damage not only to the nose, but to the ears, by violent and frequent blowing of the nose. Snuffing up water or salt solution is a common and dangerous habit, and should not be done except when advised by a physician. Douching the nose is always dangerous to the ears.

Inflating One's Own Ears

Many people who have congestion in the middle ear and loss of hearing because the Eustachian tube is congested, "blow out" or inflate their own ears frequently by holding the nose and puffing out their cheeks under pressure. This is treatment that is very dangerous and should only be done by a physician. Many people have done it for years, and have even been advised by a doctor to do it. Almost all of them have lost hearing by doing so, as nearly all of them overdo it. It is less efficient but far more safe to do yawning exercises, that is, pretending to or actually yawning or going through the

motions of yawning. This, even in stubborn cases, if persisted in, will relieve the change in pressure in the ears. Occasionally holding the nose and swallowing some water will give results. Chewing gum at times will help; this practice is followed while flying in an aeroplane.

These are only a few important local things to think about. The following precautions should also be taken.

Caution in Use of Drugs

I have mentioned drugs as a cause of deafness. Quinine is one of the most harmful. In malarial districts it has to be used against malaria, and has saved many lives, but has caused a great deal of severe deafness. It should seldom be used except for malaria. Obstetricians once used it to hasten the onset of labor in childbirth. There is a great deal of evidence that the drug used in this way is harmful to the children's hearing, although the destructive effect was not noted, of course, until later. Therefore, quinine is seldom so used by obstetricians in more recent years. Bromoquinine and other quinine mixtures often used for head colds are dangerous drugs. Quinine in any form is destructive to the internal ear. Salicylates also often harm the inner ear. Aspirin is the most commonly used drug in this group and large doses of it, or its frequent use over a long period of time is dangerous for the ears. It must be remembered that many drugs such as bromoquinine, aspirin, and other headache and pain relievers, as well as alcohol and nicotine, often have a cumulative effect. They may not seem to do harm up to a certain point, then suddenly terrific harm and destruction take place. Any drugs that relieve pain or induce sleep or have an effect on the circulation should be used sparingly and infrequently when one considers the health of the ear.

Habits and Sanitation

The matter of habits and sanitation is of considerable importance to the hearing. We have spoken of noises both incidental and occupational. Another important factor is the air we breathe. Fresh air is necessary to human life. It does not have to be a windstorm or a draught or cold in order to be fresh, but it should be pure. Sleeping rooms should be ventilated with adequate exchange of air from other rooms or from the outside. Many cases of deafness have undoubtedly occurred from stuffy rooms, particularly overcrowded rooms or those heated with gas or oil-burning heaters where there is too little oxygen present, or even the admixture of a continual small amount of carbon monoxide or other poisonous gas. Climate influences some people much more than others. Some people can stand or even thrive under the rigorous conditions of a cold open-air sleeping porch, whereas others have continual head colds under these conditions. Each individual must find out how

to modify his living and sleeping conditions by giving them intelligent thought, and making sensible changes and corrections.

Diet

During the last fifty years there has been a great change in our diet. True, we still eat the same things, but in so many cases these same things have been greatly changed before they get to our dining room table. Also, certain forms of foods have been made so easily available and so easy to prepare and serve that laziness rather than intelligence makes us serve them the easy way. It is not only probable but also quite possible that some of the vegetables as well as some of the meats that we now eat are less nourishing than formerly because of the scientific way in which they are grown to produce size, beauty, and weight. The round steak served twenty-five years ago was probably not only better flavored but also more nourishing than the more attractive appearing cuts of today. The same may be true of the carrots, beets, turnips, and cabbages. The canning and preserving of all forms of foods and juices have gradually eliminated many of the best parts of them.

It is evident that proper nourishment is very important not only to general health but also to the health of the various parts of the body including the ears and eyes. The blood gets valuable materials from the digestive tract and distributes them to the various parts of the body. Every part needs the oxygen which the blood takes from the lungs. Each part needs water which the blood gets from the intestinal or digestive tract. Most people do not drink enough fluids such as water, milk, or fruit juices. Milk is a food that contains not only a high percentage of water but also necessary food ingredients such as proteins, sugars, fats, and minerals—particularly calcium and phosphorus. Unless they find milk definitely indigestible both children and adults should drink or have in their food at least one pint of milk a day. It is seldom that milk proves to be indigestible. It is not one of the mucus-producing foods and is perhaps one of the most important foods that we have.

We have learned in recent years about vitamins. These vitamins are contained in foods and we know that several of them are essential, namely those designated by the letters A, B, C, D, and E. Modern diets often lack these vitamins and the canning and modern preparation of foods has destroyed many of them. The whole body has suffered from the lack of vitamins, and thus the ears have suffered in turn. It is possible to add vitamins to the diet by taking them in pill form. At times this is necessary but a proper diet of foods that are not too refined will supply a sufficient amount.

Foods must have elements for nourishment, that is, tissue-building and energy-producing minerals such as calcium, phosphorus, iron, copper, iodine,

salt, magnesium, manganese, and zinc as well as vitamins. Without the proper ratio of these, the body and the special parts suffer eventually.

An essential diet for the average adult would be a minimum per day of one pint of milk, one or two eggs, one serving of meat, potatoes, and one or two cooked vegetables, leafy or green vegetables either cooked or in salads, raw vegetable in limited amounts, fresh orange, grapefruit, or similar juices, at least a glass full, or other fresh fruits such as apples, peaches, or plums, and in addition cereals, breads, fats, and a reasonable amount of sweets.

If a person is doing hard physical work, he needs more carbohydrates (bread, butter, potatoes, and fats) to keep up his bodily needs, as well as more of all foods. The sedentary person—clerk, secretary, housewife, or writer—is more often in danger of eating too much starchy foods or too much sugar. Such a person does not burn up these foods by physical labor and the result is a stagnation in the intestinal tract and secondarily catarrh of the nose, the sinuses and mucous membranes. Often as a result, the Eustachian tubes and ears are affected, causing middle-ear or conductive deafness. People not doing a good deal of physical exercise or work should be very careful to restrict the amount of their starch and sugar foods. If a person has a chronic stuffiness in the nose, has frequent protracted head colds, and a tendency to mucous catarrh in the nose, one of the first questions to ask is whether his diet contains too much starch—bread, cakes, potatoes, pastry, and pastes, or too much sugar—candy, cakes, or desserts.

The subject of diet is a very complicated one indeed and only a few general statements can be offered in this bulletin. There are many books and pamphlets available for a more detailed study. However, intelligent procedure based on the foregoing discussion of food elements and the importance of diet may be of help. It seems evident that the cause of many hearing impairments may be traced to deficiencies of diet. Certain foods are poisonous to one person and not to another. Certain people are sensitive to certain foods, plants, or animals, which cause nose, throat, ear, chest, and skin troubles. Careful avoidance of these by the affected individual is important, and must be studied by the individual himself.

Other Considerations

There are certain conditions of health that must have the attention of a physician. Earache and running ears are very dangerous to life as well as to hearing and need skillful medical attention. Mouth breathing, chronic running nose, and stuffy noses should have medical investigation. The acute fevers, scarlet fever, diphtheria, measles, and mumps may be very damaging to the ears, as well as typhoid, malaria, syphilis, and other general diseases.

Not all deafness can be prevented or cured, but a high percentage of prevention and cure is possible if the condition is detected early and handled intelligently. Every year we learn more, and although progress is slow, it is steady. In the last few years we have learned a great deal about vitamins and their relation to health. As yet there is no specific value of these in deafness, but a deficiency of some of these in the diet has undoubtedly been a contributing factor in many cases of deafness. New operations for restoration of hearing have received a good deal of publicity recently. These are as yet in the experimental stage except in a few carefully selected cases, and there are as yet only a few men in the world who are doing this work and who are competent to perform these operations at the present time.

Secondary Effects of Impaired Hearing

Certain secondary effects of impaired hearing are important and should be mentioned in this article.

Head noises or tinnitus are a common accompaniment to impaired hearing. These are sometimes very loud and severe and seriously distracting and annoying. Many different sounds are described by different patients from slight sound of escaping steam to the continuous loud roar of the blowoff pipe of a locomotive; from the sound of the ocean echo heard in a cockleshell to the roar of breaking waves on a rocky shore; from the slight sound of crickets to the shrill sound of a high violin tone; from a slight continuous musical note to the roar and clash of a full orchestra and band, each instrument playing a different piece. All degrees and combinations are described.

The simplest form of tinnitus is caused by wax or a foreign body against the eardrum. The removal of this substance clears up the noise. Another simple form comes from a congestion in the middle ear that often causes a low hum or at times a pulsation of heart or pulse. This clears up after inflations of the ears and when the congestion is relieved. Adhesions, chronic thickenings, and scar tissue in the middle ear are a frequent cause and are sometimes relieved by treatment. Slow degeneration of the nerve elements of the inner ear, due to changes in the blood supply and poor nourishment of the part and to the various poisons in the blood usually cause the most stubborn and most severe noises, and are the hardest to relieve. In otosclerosis the tinnitus is often severe and impossible to relieve.

There are certain things which patients with tinnitus should avoid in order to help themselves. First, overfatigue, particularly mental or nervous fatigue; use of drugs, particularly alcohol and other stimulants; improper diet, particularly overeating of sugars and carbohydrates. These should be avoided.

Patients with severe tinnitus should remember that the severity of the trouble as well as its effect on them will be governed by their own ability to

accept and bear up under it. A proper balance of resignation and ability to ignore and forget the everpresent noise will make the affliction much easier to bear. The psychological effects of impaired hearing are many, and they are very important.

Operation for the Restoration of Hearing

The Fenestration or Window Operation

In recent years, follow-up of several thousand patients who have undergone the fenestration operation in the hands of skilled surgeons provides evidence that this method of restoring hearing is one of the greatest developments in otology in many years. It is particularly adaptable to cases of otosclerosis and, as a matter of fact, must be restricted almost exclusively to those suffering from a pure form of conductive deafness. Patients with a nerve or perceptive deafness are not benefited but are often made worse by this operation.

Otosclerosis or other forms of conductive deafness are not benefited if there has been a secondary degeneration of the nerve or internal ear. There may be a high degree of loss of hearing by air conduction, but bone conduction must still be retained to a high degree. Patients are selected by a very careful investigation of these two factors. Very marked improvement of hearing, as well as very marked improvement in the relief of head noises, follows a successful operation. A patient should be in good general health, and ordinarily not over forty-five to fifty years old. Under these conditions there is a fairly good chance of success, although even under ideal circumstances failures and even complete loss of hearing does occur in the operated ear.

The operation is a very highly technical one, needing the greatest experience and skill on the part of the surgeon, and it should be performed only by well-trained, highly skilled, experienced specialists. It is perhaps unfortunate that a number of otologists have taken up this operative procedure with neither the proper experience beforehand nor the proper training to perfect the operation. Only otologists who have access to a great deal of clinical material and are willing to undertake thorough preparation and practice in this work should attempt this operation.

ARTIFICIAL AIDS TO HEARING

NORMAN A. WATSON, *Associate Professor of Physics;* VERN O. KNUDSEN, *Professor of Physics and Dean of the Graduate Division;* RUTH B. WATSON, *Assistant in Research on Hearing Aids, University of California, Los Angeles*

A hearing aid is any device which helps a person to hear better. Most of the devices offered to the public as hearing aids are truly *aids;* others, however, are of no assistance, while a few are actually detrimental.

THE IDEAL HEARING AID AND STANDARDS FOR HEARING AIDS

The ideal hearing aid has often been defined as that aid which would allow the user to hear just as if his hearing were unimpaired. This is a misleading definition; *no* hearing aid can make an individual with a hearing impairment hear *exactly* as if his hearing were normal. The rational definition of an ideal hearing aid must, therefore, be limited to the following: a device which would make it possible for the individual to utilize his residual hearing to the fullest possible extent for a definite purpose, such as understanding speech or enjoying music, under specified conditions. Such an aid does not exist, although it is possible to approximate it in the laboratory in many cases, and the best wearable hearing aids do a remarkable job.

Some hard-of-hearing persons expect the impossible from wearable hearing aids and contrast them unfavorably with spectacles, which can be fitted accurately. By comparison with what is expected of hearing aids, however, what is expected of spectacles is simple: merely to supplement the eye lenses in the focusing of light on the retinas. One does not expect spectacles to increase the intensity of light, but one takes it for granted that the hearing aid will amplify sound—and it does. One does not expect spectacles to get light through a cataract and onto the retina, but one does expect the hearing aid to by-pass a conductive impairment—and it does—by the use of increased power or bone conduction. On the other hand, the exact individual fittings of hearing aids sometimes promised are myths.

Certain standards can be set for hearing aids. Various tentative standards have been offered by research laboratories; and, at present, two national groups are working on standards: (1) the Subcommittee on Audiometers and Hearing Aids of the American Standards Association, and (2) the Consultants on Audiometers and Hearing Aids to the Council on Physical Medicine of the American Medical Association. The setting and meeting of these standards will bring instruments of increasingly higher quality to the market.

Types and Characteristics of Existing Hearing Aids

Hearing aids are usually divided into two groups: mechanical and electrical. There is also the classification as to air- or bone-conduction, depending on the way the sound is sent to the ear, but such a division is secondary.

Mechanical Hearing Aids

The hearing trumpet, the hearing tube, the acoustic fan, and the like, are examples of the mechanical type of hearing aid. In most of the recent articles on hearing devices the mechanical aids are omitted entirely or dismissed with a few derogatory remarks. The best of them are, however, superior to the poorer electrical instruments; and, for certain special purposes, the ruggedness of some of the air-conduction aids—the hearing tube, for example—makes them much more desirable than the electrical aids. The mechanical bone-conduction aids are generally too awkward and inefficient for practical use. The small insert-type mechanical aids (not to be confused with individual earpieces for electrical hearing aids, or artificial eardrums and rod prostheses carefully made and inserted by an otologist) are generally useless and sometimes they may even be detrimental to hearing.

Electrical Hearing Aids

The electrical aid consists of four essential parts: (1) the microphone; (2) the amplifier; (3) the receiver (air-conduction earphone, or bone vibrator); and (4) a source of power (batteries, or power pack operating from electric power mains). These parts may be combined in different ways, such as keeping all parts separate or combining microphone and amplifier or even microphone, amplifier, and batteries in one case. The tendency today is toward the all-in-one arrangement. Electrical aids are classified according to the nature of their essential parts into two types: the carbon type and the vacuum tube type.

The carbon aid consists of a carbon microphone, a carbon amplifier or "booster" (sometimes omitted when only slight amplification is required), a receiver (air- or bone-conduction), and a low-voltage battery.

The vacuum tube aid consists of a microphone (usually the crystal type), a vacuum tube amplifier, a receiver (air- or bone-conduction), and batteries (low voltage "A" and high voltage "B"), or a power pack to plug into electrical power mains. The very tiny batteries used in the new one-unit wearable aids have short life and are comparatively expensive to use, but they greatly increase portability.

Most of the vacuum tube aids today are better than the best carbon aids. However, simply because an aid is a vacuum tube instrument, it is not necessarily better than a carbon aid; the best carbon aids are distinctly better than some vacuum tube aids.

The physical characteristics of many of the vacuum tube and carbon aids have been determined within the past few years under the National Defense Research Committee's Aural Rehabilitation Project. The detailed results have not been released, but certain general trends have been included in published articles. One predominant finding was the similarity in major characteristics among the better aids, with variation only in minor details.

Methods of Evaluating Hearing Aids by the Purchaser

Many methods of selection of wearable hearing aids have been developed in the last few years—some of them at the Army and Navy Aural Rehabilitation Centers, others at laboratories under the National Defense Research Committee's Aural Rehabilitation Project, and still others at independent laboratories or hearing aid factories themselves. Most of the methods require special facilities with comparatively elaborate apparatus, and thus are not available to the average individual. There are, however, a few Hearing Centers where the individual can obtain help: for example, the San Francisco Office of the Bureau of Vocational Rehabilitation, and certain Hearing Society Headquarters.

For an individual "on his own" in selecting a hearing aid, the following suggestions may help in obtaining the best available aid for use by him for a given purpose under a given set of conditions.

(1) Obtain an *individual ear mold* if at all possible for use with all instruments tried. "Universal" ear molds do not give a true estimate of the value of an aid, because they do not provide a good enough acoustical seal in the ear. Acoustical "feedback" or "squealing" and leakage of sound result from the use of such molds.

(2) Check whether or not each hearing aid has been *accepted by the Council on Physical Medicine of the American Medical Association.* Such acceptance insures certain minimum structural and operational standards and acceptability of advertising issued by the aid's manufacturer. Information regarding the acceptance is readily given by company representatives whose instruments have been accepted. If a given aid has not been accepted, it means one of three things: the instrument is new and has not been passed on by the Council; the instrument is sub-standard; or the advertising policy of the company has not been satisfactory to the Council.

(3) Keep in mind the following information regarding the *methods of selection* which may be used to "fit" a hearing aid:

(a) Selection by *personal preference,* is one of the poorest methods of all. The hard-of-hearing person usually likes best an instrument which amplifies most those sounds which he is used to hearing, and which amplifies only slightly, if at all, those sounds which he cannot hear unaided, or hear only very imperfectly. This is especially true of a person who cannot hear high tones, including those necessary to distinguish consonants. He tends to select a "mellow" instrument which amplifies the lower or middle tones; and to reject as harsh-sounding and "unnatural" the instruments which amplify the higher tones and allow him (as proved by adequate articulation tests) to hear speech better than the one he selects purely on the basis of personal preference.

(b) Selection by the use of a super *"choose-o-meter,"* which allows a very large number of combinations of microphones, amplifiers, earphones, and batteries is selection by personal preference on a more grandiose scale, usually, and is subject to the same weaknesses. It is limited by the assortment of microphones, amplifiers, earphones, and batteries which can be switched into combination. It does have one advantage over the separate instruments in that it allows easier change from one combination to another.

(c) Selection on the basis of an *audiogram alone* is not satisfactory in most instances, although the audiogram often gives valuable information in the choice of an aid. The audiogram gives a measure of the hearing loss of the individual at intensities which are threshold intensities for him. To understand speech or enjoy music he must listen at levels above threshold. His loss for above-threshold sounds may be, and frequently is, quite different in nature from his loss at threshold. Furthermore, his handicap in hearing above-threshold sounds may not be as great as in hearing threshold sounds. Thus a method of selection involving above-threshold sounds would be better than an audiogram. For this reason a "most comfortable equal loudness curve" has been used by the authors for prescription of an amplifier in the laboratory. However, even a "most comfortable equal loudness curve" does not offer the most practical method of choosing among *available* aids, because even the best wearable aids usually cannot meet the requirements set by a "most comfortable equal loudness curve" prescription.

(d) Selection on the basis of an *"aided-audiogram,"* that is, by comparison of a person's threshold of hearing without an aid with his "thresholds" using different aids, is completely unreliable if the "thresholds" are determined with the receiver of an audiometer, or other "O-ometer" which is essentially an audiometer, first placed over the ear of the person, then over

the microphones of the aids under tests. This is because the "coupling" of the audiometer receiver to the microphones of the hearing aids is so different from the "coupling" to the ear that the comparative "thresholds" thus obtained are meaningless. The "aided-audiogram" is of some use if the tests are made in a special acoustically treated test room with a calibrated loudspeaker as source.

(e) Selection on the basis of a *casual conversation test* is unreliable, because the sentences and phrases used may often be easily guessed or readily interpreted from cues, without the various speech sounds being actually understood.

(f) Selection on the basis of a *number test* is risky, because numbers can be distinguished or guessed from the vowel sounds in them. Thus a given hearing aid may yield a high score with a number test without making it possible for the user to hear and distinguish the consonant sounds which are most important in the understanding of speech.

(g) Selection on the basis of *sentence intelligibility tests* is inconclusive if only a few sentences are used and extremely time-consuming if sufficient sentences are used.

(h) Selection on the basis of an *adequate simple-word test* promises to give the best results where comprehensive facilities are not available. Such a test is described in section (4) following.

(4) After the company representative has obtained the best fit he can by his method, *test the hearing aid's adequacy by the following word test.* The test has been devised by the writers, based on the test methods and lists of words developed by Harvey Fletcher and J. C. Steinberg of the Bell Telephone Laboratories. The test consists essentially of listening to different arrangements of the test words first with the aid recommended by the company representative, then without it—for each of the aids under consideration. The group of words to be used in the test is given below. Practically all English speech sounds are included. The words are one-syllable English words with which almost everyone is familiar. The words for testing vowel sounds (hereafter called "vowel" words) consist of the various vowels between the same pair of consonants, e.g., *b* and *t,* as in b*i*t, b*e*t, etc., or *b* and *k* as in b*a*ck, b*u*ck, etc., so that it is necessary for the listener to interpret the vowels correctly to get the words right. The words for testing consonant sounds (hereafter called "consonant" words) consist of various consonant sounds before the same vowel, e.g., before long *i,* as in v*ie*, st*y*, etc., or after the same introductory consonant and vowel, e.g., after *wi* as w*in*, w*ith*, etc. The numbers of "vowel" and "consonant" words and their relative importance in the scoring of the test were based on the extensive experience of the Bell Telephone Laboratories.

Vowel words			*Consonant words*		
bAck	bIke	Ben	Ken	Pen	Ten
bAt	bIte	riB	wicK	riP	Tie
bAit	bOat	riCH	Let	Ret	wiTH
bAke	bOat	Den	Lie	Rye	THy
bAlk	bOOk	Debt	wiLL	weiR	THigh
bOUght	bOOk	riD	Men	Set	Vet
bArk	bOOt	Fie	riM	Sigh	giVe
bEak	bOOt	riFF	Net	hiSS	Wet
bEat	bOUt	riG	Nigh	SHy	Wen
bEck	bOUt	Guy	wiN	wiSH	Yet
bEt	bUck	Hen	siNG	wiST	hiS
bIt	bUt	High	riNG	STy	wiZ
bIt		Jet		peT	

The test should be made with the assistance of someone who has a distinct conversational voice—the *same person* for each test so as to have uniformity of test-voice. This person is hereafter designated the "caller," and the prospective user of the aid the "listener."

The words are prepared for the test by printing each word on a separate card (preferably the ordinary unruled 3 by 5 inch filing card), with the letters representing the sounds to be tested capitalized as in the above list. The person who is to try out the hearing aids (the listener) should look over the cards before the test or have the words read to him. In this way he can familiarize himself with the words and the speech sounds in them since it is the object of the test to find out whether he recognizes the speech sounds in familiar words, rather than to find out whether he can guess them from unfamiliar words. The test should be given in a room which has a few areas of hard bare walls, floor, or ceiling as possible and which is so quiet the hard-of-hearing person can hear *no* noise.

This will give the effectiveness of the aid under ideal circumstances. It is also desirable to test it under noise conditions approximating normal use. For accuracy, the type of noise and its intensity must be the same for each test.

Two procedures are suggested for conducting the test: Procedure I, for the listener who can write; Procedure II, for the listener who cannot write.

Procedure I (for the listener who can write):

1. The caller provides the listener and himself with pencils and recording charts with the following on the charts. At the top: the name of the listener; the name of the caller; the date; the instrument being tested; the ear in

or near) which the receiver is placed; and spaces for the vowel score V, the consonant score C, and the test score T. Spaced over the rest of the chart are three columns of numbers, each followed by blank spaces for the test words: first column, 1-25; second column, 26-50; third column, 51-75.

2. The caller shuffles the test cards thoroughly so that the "vowel" words are quite evenly distributed among the "consonant" words.

3. The caller and listener take seats facing each other, with the caller's lips three feet from the microphone of the hearing aid, which is attached to the listener in the recommended manner. Even if the listener has no aid on, he should sit in the position described—just as if he did have an aid.

4. The caller instructs the listener *not* to watch his lips but to listen carefully and to write each word as he hears it opposite the correct number.

5. The caller then calls in a conversational voice: "The first is: (pause) men." He writes the test word on his recording chart opposite No. 1, capitalizing the letters representing the sound to be tested, thus: mEn. (He should shield his list so the listener cannot see it.) The listener writes it opposite No. 1 on his list. The process is repeated for the second word thus: "The second is: (pause) bat," and similarly for each of the remaining words in list. The caller should maintain his conversational voice at a constant loudness. He should not over-emphasize the sound to be graded, but should keep the pitch and intensity of his voice constant for the test word and not drop his voice as is usually done for the last word in a sentence.

6. The caller reshuffles the cards thoroughly to avoid any memory effect and repeats the test for the same hearing aid.

7. The same procedure is followed for two tests on the same aid in the noisy surroundings.

8. The same procedure is followed for each aid under consideration. Care should be taken by the caller to use the same loudness of voice for each aid, and especial care to use the same loudness for the "no aid" test as for the tests with the different instruments.

Procedure II (for the listener who cannot write):

1. The listener has no recording chart: the caller's chart is the same as in Procedure I except there are two blank spaces after each number.

2. The caller prepares the test cards as in Procedure I.

3. The caller and listener take places exactly as in Procedure I.

4. The caller instructs the listener to listen carefully to each word, *not* watching his lips, then to call back the word he hears. (It may be desirable to have the listener close his eyes so he will not see the list or the caller's lips.)

5. The caller records the first word in the first blank space after No. 1, thus: wiZ, capitalizing the letter for the sound to be tested. (He should be especially careful to shield his list from the view of the listener if the listener's eyes are open.) Then he calls the word, "The first is: (pause) wiz." The listener calls back the word as he hears it, and the caller records the listener's interpretation in the second blank space after No. 1. The process is repeated for the second word, and similarly for each of the remaining words in the list.
6. The caller reshuffles the cards and repeats the test as in Procedure I.
7. The same procedure is followed for two tests on the same aid in the noisy surroundings.
8. The same procedure is followed for each aid.

Grading of the lists and calculation of the test scores. The grading is done in the same manner for lists recorded under either Procedure I or II. The caller compares his own list with the listener's or with his list of the words called back to him by the listener and marks wrong those words in which the listener did not get the test sound correct. The caller then calculates the test score as follows: Each vowel sound correct in a "vowel" word counts 4 points toward the "vowel score" V. The "vowel score" for a single test is, therefore, four times the number of vowel sounds correct in the "vowel" words. A perfect "vowel score" is 100, since there are 25 "vowel" words. Each consonant sound correct in a "consonant" word counts 2 points toward the "consonant score" C. The "consonant score" is two times the number of consonant sounds correct in the "consonant" words. A perfect "consonant score" is 100 since there are 50 "consonant" words. The test score T is C times V times C divided by 10,000. For example: if 20 vowel sounds are correct, the "vowel score" V is 4 times 20, or 80; if 30 consonant sounds are correct, the "consonant score" C is 2 times 30, or 60; the "test score" T is, then 60 times 80 times 60 divided by 10,000, which equals 28.8. To the nearest whole number, the "test score" T is, therefore, 29. The average "test score" for each aid under quiet conditions is the average of the "test scores" on the two tests taken with that hearing aid under the conditions of quiet; the score for no aid is the similar average with no instrument. The average "test score" for each aid under noisy conditions is obtained in similar fashion. A comparison of these scores for similar conditions gives the superiority of each aid over "no-aid" and also relative ratings to the various aids for the individual listener.

Possibilities for the Improvement of Hearing Aids

In the use of all ordinary hearing aids, it must be remembered that "one-ear" listening is involved and that all directivity and cues to pick out

a certain sound source are absent, and that the apparent reverberation and noise in a room are greater than for two-ear listening. *Binaural* aids (a complete instrument for each ear) simulate the effect of two-ear listening. If they are used, they will help the individual to determine the direction from which the sound comes. They will make speech and music sound more natural to him than a single aid possibly could, and therefore, will function more nearly like an ideal aid.

PRACTICAL HINTS FOR HEARING-AID USERS

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The following suggestions derived from the experience of wearing a hearing aid for many years are offered for what they are worth to the hearing aid user.

Purchasing a Hearing Aid

In the first place, when you purchase a hearing aid, have a clear understanding of what you are buying. You are buying a delicate electrical instrument with many small parts, any of them liable to suffer damage from a number of causes. The instrument is temperamental, and no two instruments of the same model will give similar results. You will need to get used to your own particular instrument, and to learn for yourself its peculiarities and its possibilities. The one function this instrument is expected to perform is the amplification of sound with a minimum of distortion. To you, it should deliver sounds that register on your damaged hearing organ in an understandable manner. It cannot correct the damage in any way. It is going to make all sounds in your vicinity louder, not merely those sounds you wish to hear, regardless of all claims to "sound filters," etc.

However carefully you select your hearing aid under testing-laboratory conditions, you would be wise to insist upon a further test under the conditions of your daily work. A scientific test in a sound-proof room is one thing; a practical test under actual working conditions will prove quite another. Some dealers welcome this, and will co-operate. Some will arrange a rental proposition, the amount of rent to apply on the purchase.

Being a delicate instrument, your hearing aid cannot be expected to last forever even with the best of service. The average life of an instrument is about three years. With good care, it may give longer service than this. The initial cost has little to do with the life of the instrument. The care and the servicing have much to do with it.

Taken by and large, you get what you pay for. An inexpensive hearing aid, bought over the counter from a dealer who has no further responsibility for it, must be sent to the factory for servicing. During the interval, you are deprived of it. The higher price of most of the so-called "standard" instruments covers a lot of valuable service near at hand, if you live near an agency, which users learn to appreciate. It is a fact that your hearing aid dealer is sincerely interested in maintaining your hearing at an efficient level. This is

what he is really selling you, not just an electrical gadget to make sounds louder.

Bear in mind that quite frequently the wearer will experience difficulties in hearing that may be blamed on the instrument, when the trouble will be in some part of the damaged hearing organ. Those who suffer from nerve deafness, especially, will wonder why they hear so well in the morning, and so poorly in the evening. Or they may be straining at the end of a long conversation, and may think their batteries are growing weak or that something has gone wrong within their hearing aid. This dulled reception really may be due to fatigue. In general, the better the tone of one's nervous system, the better he may expect to hear. Use the instrument judiciously, and try not to tire yourself out.

I have read what purported to be "expert advice" to hearing aid users, advising that the switch be kept on constantly, the argument being that the normal ear is constantly open to all sounds, and we should therefore strive to approximate the normal condition. "Experts" seem to forget that a damaged hearing organ may not be able to sustain continuous amplification any more than an amputated limb can sustain the continuous use of an artificial limb merely to approximate the normal condition. Rest your hearing all you can. Conserve your nervous energy.

Those who are dependent upon a hearing aid in their daily occupations will learn to maintain a spare instrument for use in emergencies, especially the transmitter part. Those who travel, and those whose work takes them away from the service centers, should always carry a spare instrument. I have had a tube burn out in the middle of an important conference. Fortunately, I had a spare instrument in my bag.

This spare, by the way, does not have to be a new, expensive outfit. You can readily obtain an inexpensive set from a number of sources that will suggest themselves.

Care of Your Hearing Aid

The effects of moisture on your instrument must be guarded against. There will be the prevailing climate of your region and the altitude. Worn close to the body, the transmitter, filled with delicate electrical parts, can become affected by the entrance of droplets of moisture, in spite of the efforts of the manufacturer to guard against this. You can easily control trouble from this source by means of a simple de-humidifier you can build out of a large-mouthed glass jar with a sealed cover, into which the parts of your instrument, except the batteries, may be placed. Purchase a box of "Silica Gel," which is a moisture-absorbing crystal manufactured by the Davidson Chemical Corporation, Baltimore, Maryland. Follow directions as to its use. Left

in the jar with these crystals overnight, your instrument will lose all moisture, and come out efficiently dry.

Excessive heat can also prove harmful. Those who live in extremely hot climates are likely to need service quite often in summer time. Intelligent study of cause and effect can hold this trouble to the minimum.

There is one peculiar effect of a sudden change in altitude, not upon your instrument but upon the fit of your ear-tip. Human tissue seems to swell when the atmospheric pressure is reduced, and this swelling, occurring in the tissue of the ear lobe, is likely to cause the tip to bind and bring about a soreness. Be prepared to have a new ear-tip made if you plan to move from a low altitude to a high one, for a molded plastic ear tip cannot successfully be tampered with.

About the Batteries

You will find the batteries to be the most aggravating part of your instrument. If you will look upon them as a necessary evil, study their construction and learn their function, you can meet the battery challenge intelligently. The old carbon instruments required a 6 volt power source, obtained through a multiple-cell dry battery constructed of zinc, carbon, and sulphuric acid. Modern vacuum tube aids call for a double power source, differing in voltage. An "A" cell is provided to give a 1½-volt current for activitating the filaments of the vacuum tubes, while the larger "B" battery, which may give up to 45 volts, supplies the power that activates the instrument, including the receiver and the microphone. How 45 volts may be obtained from a small dry-cell battery is one of the mysteries, and if you will tear the covering from an old "B" battery and study its construction you can understand why one costs so much more than an "A" battery cell. You may come to realize, too, that such a battery can hardly be constructed so as to deliver unerringly a specified number of power-hours—that battery performance will vary.

According to my observation, many hearing aid users worry too much about "wasting their batteries." They begrudge the trifling amount it costs to maintain their instrument with full-powered batteries, fresh and responsive to all demands on them. They will cling to old batteries in the attempt to wring the last final drop of power from them. As a matter of fact, there is considerable power remaining in a battery after it drops below the level of power-output demanded by the hearing aid. Old "A" batteries can still operate in a flash-light. A 45-volt "B" battery will not prove effective in the hearing aid after it drops down to 30 volts, but it still would prove effective with an instrument that requires less power, and can be passed on to a friend who uses such an instrument, or else given to your local Society for the Hard of Hearing for use of some worthy member.

Without proper batteries of sufficient strength, your valuable hearing aid is useless. The "power pack" has always been the embarrassing part, in the matter of its disposal about the person, especially with women users. It is all very well for the directions to advise strapping the battery pack to the leg, or otherwise fasten to the wearer's body in some inconvenient place, but modern clothing does not always absorb and conceal bulky objects. Men can carry a heavy power pack in a leather case suspended from the belt, and soon grow used to this. However, the woman wearer must exercise considerable ingenuity in disposing of even the small sized batteries about her, with any degree of comfort. Various types of harness constructed of wide cotton tapes may be worn under the clothing, to which transmitter and batteries may be attached in more or less comfort. One should not be held down to the brief suggestions in the instruction booklet, but should attack the problem in an individual manner.

The latest model instruments, "monopack" or "unipack," are an answer to the old problem of how to dispose of the batteries. This remedy was long in coming. By improved design and new materials, batteries may now be greatly reduced in size, and with corresponding reduction in size of transmitter parts in some instruments, we now find the batteries inserted in the transmitter case. This advanced design not only eliminates the extra power pack, but it does away with the bulky power cord, resulting in two main parts connected by one thin cord from transmitter to receiver. Women especially favor this model, for obvious reasons, even though some advantages may be sacrificed in order to reduce bulk.

Whatever type of battery is used, you should recognize the battery cell as a consumable item, and be willing to throw away weakened cells without a qualm, thus keeping up the power supply and maintaining your instrument at its highest efficiency. Your "A" cells will cost from ten cents to twenty-five cents each. They may be purchased in dozen lots, and stored in such a manner that they can be rotated in use, with no cell used for more than one day continuously. After a day's use, an "A" cell will renew its strength if allowed to rest for a week or so, and can be used over again several times with rests between. Some prefer, however, to use an "A" cell continuously for two or three days and then throw it away. Experiment will soon teach you which is the better plan. The "B" batteries, being of a different type, are to be used continuously until their voltage drops below the limit of efficiency, when they should be definitely discarded. Remember that used dry-cell batteries tend to become corroded, and in time acid will work through which can cause great damage to clothing or whatever it may come into contact with.

While wearing your instrument, turn off the switch if you wish to rest your ear, but never for reasons of battery economy if you really should leave

the switch on. Just consider your battery expense as part of the electric light bill, and meet it gladly so long as your hearing is necessary to your happiness and well-being. But don't expect an expensive instrument to deliver on old, run-down batteries costing such a trifling sum. Why let a 10c gadget stand between you and good hearing?

Read your instruction book carefully, when you start out to get acquainted with your new instrument. In addition to the instruction book, some of the companies put out small publications regularly, filled with suggestions for better results coming from resourceful users. From time to time, you may find some such suggestion that will solve a problem for you.

The purchaser of a new instrument will likely find the carrying case mentioned as fashioned of "simulated leather," or of pigskin, or of colored plastics lined with rich velvet. This elaborate carrying case has absolutely nothing to do with the function of your hearing aid, and the best thing you can do with it is to put it away and forget it. Beginners usually go through the ritual of disassembling their instrument at night, and placing the parts back carefully in the case. This wears out the connections. Instead try this suggestion:

Select a drawer in chiffonier or dresser, about waist high. As you undress each night, remove your instrument after shutting off the switch, and place it carefully in this drawer on top of some soft material. Reverse the process when dressing. You can keep your battery supply and your volt-meter in the same drawer, everything handy.

Speaking of volt-meter, this is an inexpensive device every hearing aid user should have. Many suggestions are advanced for detecting the loss of power in batteries, and there are at least half a dozen ways in which such loss of power becomes evident. However, a small volt-meter will tell you more quickly and surely than anything else. By all means purchase a volt-meter suitable for testing the type of batteries used in your particular instrument, and remove all guess-work. When you have reason to believe your instrument is not working properly, first check your batteries. Oftentimes this will save you the trouble of a trip to your service man, or the deprivation of your instrument while waiting for factory repairs. The following experience will illustrate:

One day, at a particularly critical time, my favorite instrument went dead, with all the symptoms of a burned out tube. I adjusted my spare, and prepared to send out the other one for repairs. As I had recently put on a fresh "B" battery I did not suspect trouble from batteries. The cords were sound, and above suspicion. Clearly, I reasoned, this was a defective tube.

Just to make sure, however, I got out the volt-meter and put it on the "A" cell. Result, a full 1½ volts. Then I put it on the "B" battery, result,

zero! While handling this battery, I noticed the needle jump, and quickly I was able to locate the loose connection beneath the battery cover—a broken wire. The instrument did not go to the repair shop that time, thanks to the volt-meter.

Receivers and Attitudes

In line with the manufacturers' effort to cut down on the size and weight of their instruments, there is also a trend away from attracting attention. For some time, receivers and cords have been obtainable in flesh color. Now, the very latest is a colorless plastic extension device which enables one to carry the receiver beneath the clothing, or hidden in the hair. The ear-tip and the new extension, being colorless plastic material, are practically invisible. Another advantage of this device is to relieve the ear of the weight of the receiver.

Receivers are of two kinds, crystal and magnetic. The magnetic receiver follows the construction principles of the telephone, while in the crystal receiver the sounds are reproduced through the action of fragile crystals of Rochelle salts which are highly perishable in the presence of moisture. In use, the magnetic receiver gives sharper, more powerful reproduction necessary in some types of defective hearing. The tones reproduced by the crystals are definitely softer. These receivers are not interchangeable; the entire instrument must be built around one or the other type of receiver. Those who intend to purchase a hearing aid should satisfy themselves as to which type they can use to better advantage.

One of the problems faced by the wearers of hearing aids is that of extraneous noise, such as that caused by rubbing or rustling of clothing. It is well to carry the transmitter in a bag made of cotton felt or flannel. Women should not permit silk or rayon lingerie to come into contact with the transmitter, as the noise made by the metallic content of this type of cloth will prove distracting. Men should beware of the rayon lining of their garments.

There is sufficient mystery about "bone conduction" to make the instrument of this type definitely fascinating to the prospective buyer. Some may be attracted to it for the reason that it can be concealed behind the ear. However, unless your hearing disability is of the type which renders correction impossible except through bone conduction, I would advise the purchaser to acquaint himself with the disadvantages of this type. The first and greatest disadvantage is the head-band, which the invention of the plastic ear-tip eliminated from air-conduction receivers. Not only is this head-band retained with the bone conduction "oscillator," but it is necessary to clamp the head-band tightly to the skull, resulting in irritation and dis-

comfort over a long day's use, and wear on the nerves. Also, there is a greater drain on the batteries than with the air conduction type of receiver.

As to efforts to render the instrument inconspicuous, I advise against such a course. There are many, many occasions when you will need to "get the breaks" if you are to hear understandably under all sorts of conditions outside of the home, and one of the best ways to assure these breaks is to advertise your disability. To hide it, and to pretend, is to place yourself at a disadvantage which can prove even more embarrassing at times than the frank admission of the disability. After all, what is gained by vain pretense?

Hearing aids are so common nowadays that they no longer draw stares. They have been definitely accepted by the youthful, and no longer are considered the badge of infirmity and old age. We can recall the time when only elderly people would dare to be seen using the old metal "speaking trumpet." Jokes involving this trumpet invariably centered about elderly people. Modern correction of defective hearing, accented among the youthful veterans of the late war, has brought the electrical hearing device into general use among persons of all ages. We cannot foretell the future with certainty, but all indications point to a continued reduction in the size of the hearing aid and its accessories. Speed the day when it can be worn within the ear, and powered from a celestial source!

MUSICAL TESTS OF HEARING AIDS

ARTHUR GARBETT, *Formerly Educational Director, National Broadcasting Company, San Francisco*

The metrical tests commonly used for testing hearing aids give a fair estimate of the total area of pitch-range and volume-range, corresponding to height and width. But a lot of things happen in that area which are not recorded by these tests.

Even in regard to pitch-range alone, you may have small tonal gaps where hearing is worse than in other ranges or not functioning at all; or you may have "tonal islands," where this hearing is better, even normal. A very simple test [1] for this condition is to play up the piano keyboard from left to right, white notes and black as they come. Note your range and any gaps or islands that may occur. If you can hear the whole stretch with your hearing aid (as the writer happily can), you are in luck. You have enough hearing with which to hear either speech or music. The piano has a range of 88 notes white and black, or more than a full symphony orchestra, between the extremes of its lowest and highest-pitched instruments, the double-bassoon and the piccolo. This is slightly over seven octaves. The four middle octaves of the keyboard (two above and two below Middle-C) cover the range of speech; a range also including a good deal of music. Our ears like these octaves best, and extreme low or high octaves are comparatively, rarely used in music.

There is also, however, the matter of tone-quality which is the distinguishing feature between one musical instrument and another, and therefore between one voice and another. The voice is a kind of bagpipe for which your lungs supply the wind.

A personal experience will explain what this means. In a broadcasting studio I was trying out a new hearing aid with the orchestra. The treble instruments were strangely rich, but the lower ones were decidedly thick. When the trombones sounded out, they were more like French horns. Trumpets and trombones "blare;" French horns "moo;" you can't mistake them.

If you haven't an orchestra handy, a good phonograph recording will do. A revealing and delightful test-recording is the "William Tell Overture" by Rossini played by a good symphony orchestra. It comes on two records

[1] If you haven't a piano to test your range, the school music supervisor or the organist of your church would probably be glad to help you make the test. It only takes a few minutes, and when it is over you know your own hearing better.

(4-sides). The RCA-Victor Toscanini recording for choice, but a lower-priced "Boston Pop" record, Arthur Fiedler conducting, will do.

The overture is divided into four distinct sections played without a break, each very distinctive and clearly defined:

PART 1: *Dawn and Morning Prayer:* A single 'cello opens on a low tone, and climbs to a high one. It thus covers about the full range of male voices: bass, baritone, and tenor. Five other 'cellos then join the first in a lovely sextet. Like many voices, 'cellos are rich in overtones. Try different volumes and tone-control while listening.

PART 2: *An Alpine Storm:* Rather confusing like a lot of people talking together, and in much the same pitch-range. Try to distinguish the instruments, especially the trombones.

PART 3: *Swiss Cowherd's Melody:* The storm dies away. A bird twitters (flute), and then comes a lovely solo for the *cor anglais* (English horn, or tenor (oboe). This instrument has a nasal sound and is very rich in overtones. Soon a flute plays high above and with it. A flute has very few overtones and is quite distinctive.

PART 4: *Cavalry Trot:* A trumpet breaks in; then comes a fanfare of trumpets and French horns. A brisk, exciting march concludes the work.

Rossini is noted for his crescendos and diminuendos (swelling up in volume and dying away), so this is also a volume test.

Overtones are subsidiary sounds "generated" by the action of a taut, vibrant string, or column of air in a pipe. All musical instruments and voices have them, and the difference in the number and variety of them distinguishes one voice from another or one instrument from another. Some, such as strings, oboes, horns or trumpets, have very many overtones, while the flute has very few. The difference in the mixture of overtones is why trombones "blare" and French horns "moo," and so on. Similar differences in the mixture affect voices similarly.

This fact seriously affects our hearing aids, which not only tends to exaggerate the overtones but also to clarify them so that they stand clear.

In normal hearing, and especially that of the untrained listener, the mixture of subsidiary overtones with the main tone, or "generator" of them, is so fused that one is usually unaware that any overtones are present. Yet they are always present in all instruments except tuning-forks, electrical tones as used in ear-tests, and other laboratory devices from which they are deliberately excluded.

Let us look at these overtones more closely. When a taut string as in a piano is set in vibration, the whole length of the string sets up sound-waves (really air-waves) of a length in proportion to itself. But the writhing and

twisting of a taut wire sets up lesser sound-waves which are also proportionate in length: one-half, one-third, one-quarter, etc., the length of the whole. These are the sound-waves which produce the overtones, also called harmonics or upper partials. The same process goes on when the air, confined in a tube, such as a trumpet, organ-pipe or human vocal organs, is set in vibration.

Since we have lost a lot of hearing, the purpose of our hearing aids is to amplify all sounds with an amplifier. The effect is somewhat the same as when a photograph is enlarged. In the enlargement, what looks like a small dot or blur turns out to be a man, a car, or some other distinguishable object. Similarly, when sounds are greatly amplified, the overtones come out of a blur of sound and stand clear. This is especially the case if you are using too much volume. The overtones of music or speech may become so prominent as to interfere seriously, and cause distortion. We need to be aware of this condition in using our hearing aid, so as to modify it as far as possible, as we can do by manipulating the volume-control and tone-control. A very simple piano-test enables us to do this quite easily.

All you have to do is to strike a note in the bass, hold it, and then listen with your hearing aid for overtones which quickly become prominent if too much volume is used.

When the hammer hits a piano-string and bounces back, the string vibrates violently at first, then quickly tapers off more slowly—like a comet with a big head and a long tail. As it tapers, the overtones become clear so that even a person with normal hearing can detect them by listening carefully. For a hearing-aid test, a good note to strike is "D," a white note between two black notes, the third pair from left to right as you face the keyboard. The resulting overtones then include the octave "d" above, and then the "a," four white notes beyond that between the second and third of three black keys. Thus we have the generator "D," and the overtones "d" and "a." It is well to strike those notes separately and in combination before testing your hearing aid to get the sound of them.

Then strike "D" alone, pounding it a little to get the string into full vibration. Then, with full volume on, hold the "D" and listen for the overtones "d" and "a." The little "d" may be obscured by the big "D" below it, but if you have on too much volume, the "a" will come in soon and stand out like the proverbial sore thumb. If you strike the black notes on either side of "a" on the keyboard, their sound will conflict with the "a" sounding in your ear as if you actually sounded the "a" as in playing the piano.

Reduce the volume and try again. Try manipulating the tone-control also. Try notes other than "d." Experience will tell you when you get the best results, and that is your "norm" or yardstick.

Two personal experiences will indicate how this works in practice:
1. A friend of mine has a rich baritone voice while his wife has a high-pitched voice. On their visits we usually end up in the kitchen. In this noisy room, I have to reduce volume for both. The voice of my friend's wife sounds best with control switch at No. 1. When her husband speaks I have to switch control to No. 2, and perhaps ask him to raise his voice in pitch. This cuts out a lot of overtones and echo so that his speech is clearer. With a four-switch control on my hearing aid, I am able to adjust my hearing.
2. Visiting a new doctor in his surgery, a reverberant room, I found he had a low, rumbling bass voice. The words were very indistinct. I reduced volume and it improved, but was still thick. When I shifted tone-control to No. 2, the effect was startling. His voice jumped an octave, became a "tenor" and was easily understood. I was listening to the first "overtone" of his voice ("d" instead of "D"). To be sure he had not himself raised the pitch, I listened while he talked to the nurse. His voice "rumbled" as before, till I again switched to No. 2, and then again his voice skipped up an octave. The nurse said later: "I am surprised you heard the doctor; his voice is so low."

"I didn't hear him," I replied, "I heard his overtones." She looked bewildered.

The "D-test" is also excellent for battery-testing. As the A-battery weakens, more volume is needed to get the overtone "a." A weak B-battery produces a noticeable change in tone-quality. If batteries are fresh, it may be that the receiver is giving out if the tone is weak; or it may be the amplifier. In this case, a visit to the dealer is indicated.

It should be realized, however, that hearing aids vary, and individual hearing varies still more. Explore the piano-keyboard, high pitch and low, in the ways suggested, to discover your individual peculiarities and those of your hearing aid. That is why you should "shop around" and rent for a week before finally buying.

But whether with piano or glass bowl or anything else, any kind of testing is valuable, simply because your mind is for the moment concentrated on one thing: overtones, batteries, or reception. In practical use as in listening to even one other person, you face two problems: you are striving to hear the words themselves, and at the same time to take in the sense of them. Even this is confusing, but there are four variable factors in listening to which we must constantly adjust both ourselves and our hearing-aids:

1. Current state of hearing: In catarrhal deafness, the only kind known personally to the writer, sudden changes of temperature, changes of weather, excessive heat, dampness, etc., or a cold in the head, will affect hearing.

2. *The speaker's voice and speech-habits:* These vary greatly at all times. Practice on the home-folks. Don't expect too much from an old man with a foreign accent and no teeth.

3. *Environment:* Rooms vary greatly in resonance and echo. Some are very noisy, while others, heavily carpeted or draped, are dull. Two or more people, different distances away, complicate matters appreciably; but in a crowded room with all talking, manipulation of tone and volume controls may help to isolate one particular person. It may help even in a cafe or barroom with a juke-box going, a fan whirring, knives, forks, and dishes clattering, etc. It often does with me.

Plainly, NO single hearing aid can meet all these conditions. You must know your own hearing, your own hearing aid, personally, intimately.

When accustomed to its use, the hearing aid should be kept "alive," as I have good reason for knowing. One day, deep in thought and with my hearing aid turned off as I went down a country lane, I crossed the railroad track leisurely, only a jump ahead of a speeding locomotive that had no business to be there at that time of day. I had actually crossed before I knew it was there, and remained unaware till I felt the hot breath of it as it whizzed by. Shortly afterward, a deaf person was killed by a train at that same place. This is a noisy, dangerous world today. We must use all the hearing we can get, and use it with skill.

Skill involves concentration and attention. As hearing gets duller, we tend to relax attention after a moment or two, make no effort to renew it, and sink into a "deaf man's coma." We must learn to listen again. Even normally hearing folk can give only intermittent attention over a protracted period, and we must strive to do at least as much. There is no specific way of doing this, but once more, music can be a great help.

Repetition is an essential element of music, simply because the listener *must* hear again what he has heard before if his attention and interest are to be maintained. So most musical compositions are written in three-part sections: a beginning, a middle and an end, with the beginning and end the same. The recognized formula for it A-B-A. If you have a phonograph available, here are a few short numbers that differ materially in the middle part. With these you may have practice in maintaining attention so as to catch the return of the first part. Records are low-priced, and take but three or four minutes to play—but the attention can wander a long way in that time. (A headset attachment cutting out the loudspeaker may be used to avoid annoying others):

1. *Praeludium,* by Jaernefelt. The middle is very dreamy; the beginning and end are lively and brisk. Watch out for the end-return.

2. *Carillon,* from the "Arlesienne Suite, No. 1," by Bizet: Three repeated notes imitate bells with merry music around them. The bells quit in the middle but sneak back. Watch for their return!

3. *Farandole,* from the *second* Arlesienne Suite by Bizet. It starts with an old French carol, "The March of the Three Kings," powerfully presented. The "Farandole," a French street dance and very lively, follows. At the end, the carol in the bass and dance in the treble are heard simultaneously. Try to hear *both.* (As with two people speaking at once.)

4. *Lohengrin:* Introduction to Act III, by Wagner. The middle-section is the familiar "Wedding March"; the beginning and end are vigorous and lively, and trombones are at one place very prominent. Listen for them.

There are quite a number of such pieces with a sharply contrasting middle, such as "Pomp and Circumstance," by Elgar; "Minuet in G," by Beethoven; "Entr'Acte" from "The Jewels of the Madonna," by Wolf-Ferrari; Sousa marches; Haydn or Mozart minuets, etc. Any musical friend can advise you of more.

A chapter such as this involves compression into words that can be read in a few minutes, facts and experiences that will spread out over your lifetime with a hearing aid. They won't all happen at once, so do not be alarmed at the thought of using one.

The hearing aid is eccentric and annoying at times, and when it is I call mine cynically, "my tin ear." But mostly it gives good, faithful, hard service. So I pin my amplifier proudly on my breast like a medal, and call it what it really is: "my bosom friend."

LIP READING AS A MEANS OF REHABILITATING THE HARD OF HEARING

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According to the dictionary, lip reading is "the catching of the words or meaning of a speaker by watching the movements of his lips without hearing his voice." It might be added that we read lips even when the voice is heard. Many persons who are not very hard of hearing have found that lip reading is of invaluable help in catching words and thoughts from indistinct sounds. Hearing-aid salesmen say that the most successful users of instruments are those who have learned to concentrate their attention upon the speaker's mouth through having had lessons in lip reading.

There are many false claims as to the wonders of lip reading; most of them are perpetrated by admiring friends who happen to have readable mouths. It is possible to understand everything that is said by certain persons, but not, as friends with perfect diction will broadcast far and wide, to "understand everything everyone says." It is impossible to understand everyone. Various conditions may interfere with the success of the lip readers: almost immobile lips, speech defects, and other imperfections. But the majority of their friends speak well, and they can learn to understand them. They can teach their eyes to see words formed by lips, and their brains can be taught to make thoughts out of impressions received visually instead of orally.

The study of lip reading will develop in the hard-of-hearing person, and even in persons who are not hard of hearing, qualities of stamina, courage, intuition, alertness and concentration. It will improve the mental process. It will open new fields of possibilities in vocational and social life. The benefits derived from lip reading are increased when a lip reader also uses an earphone and arranges his desk or bench, when at work, so that the light falls on the face of anyone speaking to him. He must use his ingenuity when meeting strangers or the general public. It is also important that he teach his fellow workers how best to make him understand with a minimum of effort. This, necessarily, requires tact.

WHO CAN LEARN

Almost anyone whose vision enables him to see a speaker's lips at a distance of three or four feet can learn something about lip reading. The amount he learns depends upon himself, upon his attitude toward his handicap, his

perseverance, his steady application, and regular attendance at classes. He may have a limited vocabulary, but he can learn to lip-read words which are within the range of, and even beyond, his capacity for understanding their meaning—if he does not take a defeatist feeling toward learning. On the other hand, he may be a college graduate, but this fact will not assist him if will not apply himself to the lesson in hand. He must remember that he did not learn to read the printed page in an hour, nor in a year; likewise, his skill in lip reading will develop only gradually. The slightly hard of hearing can profit fully as much as the more severely hard of hearing; the traits of character which are acquired in the learning stand one in good stead, as does lip reading, when the years go by and the hearing loss increases. Age seems to make little difference in the ability to learn; there are public school classes for children and for adults. In the latter the ages range from eighteen to eighty.

Locations of Classes

In California the public schools support lip reading classes in most of the larger cities and in a few of the smaller towns. Some of these classes draw pupils from a radius of twenty miles. In the metropolitan areas there are as many as twenty classes each week. There are at least two private schools for adult pupils, and there are private tutors for all ages. Some of the local chapters of The American Hearing Society provide free lessons, and every chapter is prepared to put an inquirer in touch with a teacher who will give private lessons. The majority of the public school teachers of lip reading will give private lessons. The University of California both at Berkeley and Los Angeles, the University of Southern California, and San Francisco State College all offer teacher-training classes.

In general it is more advantageous to attend a public school class in lip reading than to take private lessons. On the other hand, in the lip reading schools conducted in the military hospitals during the second World War, it was shown that in private lessons the pupils more readily understood and learned to follow conversation through lip reading. While it is true that rapid progress is made in private instruction, this advantage is offset by the fact that very often the pupil learns to understand only his teacher. This fact, too, was proved in the military schools for deafened service men. In a public school class there are many types of mouths for practice; there is an uplift to the morale in associating with others who have suffered a similar loss and in observing what can be accomplished. There is no finer democracy than a public school class in lip reading. Here are the rich and poor, the very hard of hearing and the not-so-hard of hearing, those who learn merely to display their learning, and those who use what they learn to do a better job. By sharing a common burden they share a common purpose. They are

willing and eager to help each other; they exchange ideas about employment, hearing aids, social service, and how to learn lip reading!

It is almost impossible to keep an up-to-date directory of the public school classes, new ones are being formed frequently, and established classes are moved to more central locations, to rooms where the lights are better or to a location on the first floor. Principals are always glad to give information and to help when they learn the needs of the group. The majority of the classes are held in the afternoon and evening. The person who would become a student of lip reading would do well to inquire at the central office of the public schools concerning classes, time, and place, since the list given below may be incomplete tomorrow. School officials will also know whether there is a branch of the American Hearing Society.

Free lip reading classes are established in the larger cities of the State. Before the war many of the smaller cities and towns provided lip reading classes for adults, but many of these classes were closed during the war as the teachers were called into the service of the military hospital where thousands of deafened men received training in lip reading. A telephone call or a letter to the local Board of Education or the nearest branch of the American Hearing Society will help a prospective pupil find a class in the nearest public school or organization for the hard of hearing.

At the present time classes are established more or less at the request and urgent insistence of the hard of hearing themselves. The provisions of the California School Code governing establishment of public school classes for adults is so worded that directors of adult education may heed the request of a group of fifteen or more taxpayers who ask for a certain type of instruction. Anyone who wishes to establish a class in lip reading should, therefore, present a petition signed by a score or more hard-of-hearing persons who would attend the class. In the future, it is to be hoped, the schools will be so cognizant of the re-creative value of lip reading that those who have suffered a hearing loss, whether children or adults, will be urged to attend classes.

Learning Lip Reading at Home

It is possible to learn lip reading at home by having a member of the family point to objects while carefully forming their names with lip movements.

Sentences and phrases may be read from an English grammar such as all of us used in our school days. There are many textbooks on lip reading, but the majority of them are written for teachers and are not easily adapted to home practice although there are rare instances of self-taught or family-taught lip readers who have used such books. The chief drawbacks to home practice are its irregularity, its lack of graded lessons adapted to progress, its

limited number of types of mouths, resulting in the student being able to understand no one outside the family, its lack of inspiration through association with others who have the same handicap. Why should one absorb valuable time taken from family activities when there are lessons to be had free of charge in the public schools? Those who live in small towns or other isolated places where there are no free classes will need, perforce, to teach themselves or have the family help them when possible. It can be done and explanations of how to go about it may be found in such books as *Silent Speech* [1] or *My Life Transformed,*[2] and others that may be obtained at public libraries.

In general, however, we would say that much more rapid progress may be made in a class which is regularly attended and into which the student pours all of his co-operative energy.

Methods Used in Teaching Lip Reading

Every teacher has his own method based upon one of four or five fundamental systems which have proved efficient over a period of years. Methods are adapted to the pupil's needs; no pupil is asked to fit a method. The systems vary in procedure from a blending of syllables into words, words into phrases, phrases into sentences, to a kinesthetic recognition of what has been said by having practiced the "feel" of the words in one's own speech organs. A method developed at the University of Southern California gives considerable promise because of its relationship to the modern emphasis on Visual Education. This method teaches lip reading by means of motion pictures. To those in isolated places the method can be of great benefit since most schools own projectors or can borrow or rent a machine. Motion pictures for teaching lip reading were used in conjunction with the other methods in all three of the Army hospitals that maintained hard-of-hearing clinics for deafened soldiers.

All methods in use at the present time have produced lip readers of poor, mediocre, or exceptional ability. Progress in lip reading, as in most other efforts depends upon the individual. A few can learn in a year or two, but, for the majority a longer period of practice is needed for real efficiency: practice day in and day out, on every type of mouth that is encountered. Any method will fail if it is not put into practice. The methods merely set forth a theory which must be put into practice, not in a haphazard way but with regular and faithful execution. In the bibliography of this bulletin a list of textbooks in lip reading will be found. The value of these books to the student depends upon his sincerity and upon his perseverance.

1. Robert Buell, *Silent Speech—A Language.* Mountain View, California: The Interstate Publishers, 1939.

2. Helen Elizabeth Heckman, *My Life Transformed.* New York: The Macmillan Co., 1928.

The ability to read lips is worth several years of one's life when contrasted and compared with spending those years in lonely, profitless isolation. The State of California is very generous in its offerings to the hard of hearing; can you afford to repay the commonwealth by insisting that you cannot support yourself because you cannot hear?

VOICE AND SPEECH CONTROL FOR THE HARD OF HEARING

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Speakers with normal hearing who are subject to stage fright or who are self-conscious and worried about whether their speech is defective or not are much more liable to abnormal voice conditions than those who have confidence and poise. This latter responsive co-ordination implies self-control. Emotion not understood nor controlled may have a most disturbing effect upon the delicate co-ordination involved in voice and speech production.

Poor habits of speech may be evidenced in the following ways: talking so rapidly that the enunciation becomes very indistinct; allowing tension to keep the voice up to a high pitch; using irregular word stress so that the ends of sentences dwindle away; ignoring the pauses that are necessary to give expression to speech; lack of volume control which results in too loud or too soft voices; and the failure to use animated inflection which results in monotony.

If these faults are often found in the average person, they are perhaps more common in the hard of hearing.

The sections which follow offer some practical suggestions with regard to voice culture for the hard of hearing.

VOICE CONTROL

To the person with impaired hearing, voice control becomes a real problem. The most noticeable faults in the voice habits of the hard of hearing are a tendency toward monotone and the inconsistent use of volume of tone. The person who is hard of hearing often either talks too loudly or else he whispers. Sometimes he goes from one extreme to the other in the same sentence. Many of these hard-of-hearing people live in fear of their own voices. They are constantly on the alert to detect the unfavorable reaction of those with whom they talk, trying to regulate, by this reaction, the volume of their voice. This constant fear and worry about themselves deprive these people of a feeling of poise.

These habits, usually developed because of hearing loss, can be largely overcome by acquiring the knowledge of the actual process of voice production, and by developing the muscles which control volume of voice, tone, quality, and pitch.

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Helpful Corrective Exercises

Although the best results are brought about through private or class instruction by a competent voice teacher, much can be accomplished through the individual's own effort. The following exercises have been found most helpful and practical in the development and control of the voice:

Breathing Exercise

The purpose of these exercises is to develop the diaphragmatic and intercostal (between the ribs) muscles, which control the stream of air over the vocal cords. The air (breath) is the raw material out of which the tone is manufactured by the vocal mechanism.

While practicing this exercise, try to imagine that you are wearing a belt, several inches wide, around your waist. As you inhale, allow the imaginary belt to expand to its full capacity. As you exhale, tighten the belt very gradually until you feel that it cannot be tightened another notch. With your tongue relaxed forward, the tip resting against the lower front teeth, inhale (through the nose) to the count of five. Hold the breath to the count of five. Exhale (sometimes through the nose and again through the mouth) to the count of five. As you exhale, hold the back of your hand in front of your nose or mouth (as the case may be), and feel the steady stream of breath on your hand. Now wait five counts and repeat the exercise, this time to the count of six. Increase the count until you can control the breath to the count of ten or twelve.

Humming Exercise

The purpose of this exercise is to develop the vocal muscles which are the controlling muscles for the pitch of the voice. This exercise also has proved most helpful in clearing the nasal cavities and the small sinuses of the head, and, consequently, in the development of head resonance (the carrying quality of the voice). If you have a piano, use it to guide you in practicing this exercise. Middle C is a good beginning tone.

First of all relax, physically and mentally.

Inhale and exhale a few times through the nose, easily and naturally.

Allow the tip of the tongue to rest behind the lower front teeth at all times when the mouth is closed. The mouth should be closed during the humming exercise.

Now hum three short tones on one pitch. Relax and repeat the hum three times on the same pitch or another pitch that you can produce without effort.

It is important, at first, that you hum very softly and with as little physical effort as possible. Always select a pitch that is easy for you. Do not force the tone.

It is advisable to practice only a few minutes at a time in the beginning as the vocal muscles are easily fatigued at this stage of their development. Practice from three to five minutes at a time. It is not necessary to vary the pitch of the hum during the first few weeks unless you care to.

The vibration is produced and performs its task as well on one pitch as another as long as the action is without effort. You may gradually work up and down from the first pitch, if you like, always limiting the practice to those tones produced without effort or strain.

The humming exercise may be practiced as much as an hour a day during the first few weeks, as long as there is a rest period of ten or fifteen minutes between the three-minute to five-minute practice periods.

When you have learned to hum without strain or tension, you may practice while you are going about your work or daily activities.

This simple humming sound is the instrumental part of your vocal expression, and should be carried as much as possible into the speaking (as well as the singing) voice.

To make the transition from the singing to the speaking quality, the exercises listed below are suggested.

1. Use the following syllables, prolonging them:

ing — m-ah
ung — m-ah
ong — m-ah

Strive to make the last *ah* retain the full humming quality, up and down the scale.

2. Start with the same quality as in the above *m-ah,* using the following vowels, one by one:

		The sound should be held the length of the breath on each, as:
m—ah	ee	m — ah — ee — m
	ay	m — ah — ay — m
	aw	m — ah — aw — m
	oh	m — oh — oh — m
	oo	m — ah — oo — m

3. Use a chanting or singing tone. Prolong the *ing* sound in each word and feel the vibration of the hum through the head and chest. Selection—"The Cataract of Ladore." (Southey)

and shining and twining, and rattling and battling,
and shaking and quaking, and pouring and roaring,
and waving and raving, and tossing and crossing,
and flowing and going, and running and stunning,
and foaming and roaming, and dinning and spinning,

and dropping and hopping, and working and jerking,
and gurgling and struggling, and hearing,
and clearing, and moaning and groaning.

Summary of Instruction for Voice Cultivation

I. Resonance — Practice the resonance or humming exercises frequently until you feel the vibration of the humming tones through the head, throat, and chest.

II. Inflection — Practice the rising and falling of tones in a musical and conversational manner. This corrects monotony.

III. Emphasis — Use emphasis of certain words sometimes with a higher or a lower pitch and again use more stress or volume for the same purpose. This provides the "light and shadow effects" to bring out better shades of meaning.

IV. Volume — The carrying power of the voice can be brought about by lengthening and strengthening the vowels. In the following selection, dwell on the underlined vowels, swelling the tones:

The ocean old, centuries old,
Strange as youth and as uncontrolled.

(Notice size of room and regulate volume accordingly)

Rate of speaking should be neither too slow nor too rapid, but governed by the subject matter and the occasion.

Pause between phrases to allow time for the ideas to register.

Keep the *image* of a *pleasing tone quality* constantly in mind until the habit is formed.

One of the best exercises for the development and control of the speaking voice is group singing. Long recognized as being especially fine for the lungs and voice mechanism, it is also one of the best recreational and healthful exercises known. Singing is particularly helpful to the hard of hearing, because the variety of pitch-change is sufficient definitely to encourage the development of the residual hearing. Residual hearing is the hearing that remains after normal hearing has gone. All hard-of-hearing people have some residual hearing which should be recognized and developed to the greatest possible degree. Many hard-of-hearing persons do not bother to listen and in consequence lose the little ability to hear that they do have. There is no better way to develop the residual hearing than through the medium of music.

Active participation in group singing is the finest method of approach to music for those with hearing impairment, because it affords the opportunity of listening and of responding to pitch-change without private instruction.

By all means—SING!

Right Thinking and Corrective Exercise Bring Poise

After the drills outlined in this chapter have been thoroughly studied and practiced, it would be well to give attention to the aspects of poise building. It is essential to realize the constant interaction of the mind and body and the necessity of understanding something of this activity with regard to speech and voice.

There is a process known as the "constructive use of the imagination"—a turning of day-dreaming into a new habit of control where definite ideals are brought into reality. For example, if failure is visualized or pictured constantly, all the subtle processes of the mind and nervous system contribute toward the production of imperfection. If on the contrary, the details of an ideal are visualized, a new pattern of response is built up.

In order to assure this actual habit forming result, definite time and attention must be given daily. Then all the drive of your imagination will gradually propel you in the direction of your goal. Mental representation in which you project yourself into a situation, detail by detail, and watch yourself acting in the way you really want to appear before others, is a learning activity. Imagining success and working for it, then testing yourself in an actual situation, is one of the best ways of achieving success. Imagining it without working for it is of no avail. The amount of concentrated attention and active striving will determine the result.

The first step in this phase of the new pattern-building is to practice relaxation. Sit in an easy chair or lie down, closing your eyes, for a period of directed rest. Become still, very still. With your mind, command every part of your body to let go. Begin with the head and go over the entire body from tip to toe. When you are really still, your mind becomes tranquil and is ready for the visualizing process.

The second step is to recall the feeling of the breathing exercises. Review them mentally, bit by bit.

The third step is to recall the sound and feeling of the humming exercise as given in this article. Add the silent recall of humming familiar tunes, feeling always the vibration as in the head and chest. This "feeling" recall is as important as the tonal or sound recall.

The fourth step is to see yourself applying these principles in actual speech situations. Begin with easy situations and proceed to more difficult ones. Fix firmly in your mind that you can make the most of your residual

hearing by becoming more aware of the feeling of control of pitch and volume, as well as of vibration or resonance. This feeling of control will in turn contribute toward confidence and poise.

The above should be practiced with daily regularity and with firm concentration. Do not let the thoughts go off in to bypaths of day-dreaming.

For the actual speech practice, at first get some friend to signal when you are using too much or too little volume, or the pitch has become high or the tone monotonous. After careful attention you should know by your muscle-tension feeling in the trunk region when the control of breath and voice is right. There is a feeling of control of the diaphragm that guides you in just the right strengthening or softening of the tone throughout the vowels in both speech and song.

We should like to close this chapter with a quotation from an unknown writer:

> Imagination is the eye of the mind, the power that calls up pictures of things not yet present, ideas not yet realized, perfection not yet attained. Imagination precedes and is the cause of all achievement. The sculptor sees his unfinished statue in the block of marble before he sets a chisel to the stone. The painter's finished picture glows in his mind before he lifts a brush. So must all human achievement—first the picture in the mind, then the realization.

VOCATIONAL REHABILITATION SERVICE FOR THE HARD OF HEARING

HARRY D. HICKER, *Chief, Bureau of Vocational Rehabilitation, California State Department of Education*

THE PURPOSE OF VOCATIONAL REHABILITATION

Work has been said to be as much a necessity to man as eating and sleeping. At any rate, every young man and most young women look forward to the time when they will take their place in the world of work; every man who loses his job, whether through injury, physical defect or otherwise, immediately thinks of the possibility of reemployment. For the physically handicapped, however, gaining a foothold as a wage earner is not always an easy task. Questions arise: What kind of work can I do successfully? Can I find work which will match my interests and abilities? How can I prepare for suitable work if the training involves expense? Who will hire a person with a physical defect, even if prepared?

The service of Vocational Rehabilitation was established to aid handicapped persons to find answers to these and similar questions. More, Vocational Rehabilitation provides the means of carrying out the work adjustment plan which the answers may suggest. Its particular function is to make employable persons who by reason of disability or physical defect might otherwise be unemployable. Its aim is to restore eligible handicapped men and women, including the hard of hearing, to a condition that will enable them (1) to work for pay, or (2) to be prepared for jobs in keeping with their highest abilities. The program is not a charity. It represents the recognized right of every person to aid in preparation for self-support.

ADMINISTRATION OF THE SERVICE

In California the service is administered by the Bureau of Vocational Rehabilitation of the State Department of Education. A central office in Sacramento and other offices listed at the end of this section are staffed with efficient workers whose services are available any place in the state.

Similar services are provided in all the other states. Detailed information can be obtained by addressing the Division of Vocational Rehabilitation, State Board for Vocational Education, Sacramento.

Services Provided

The program is so broad and liberal as to include practically any service needed to render a disabled person employable. They are listed as follows:

1. Thorough physical and aural examinations.
2. Necessary medical, surgical, psychiatric, and hospital services.
3. Hearing aids, if necessary.
4. Individual counseling and guidance.
5. Training for jobs—in schools, on the job, by correspondence, or by tutor.
6. Maintenance and transportation during rehabilitation, if necessary.
7. Necessary tools, equipment, and licenses.
8. Placement in the right job.
9. Follow-up to make sure the rehabilitated workers and the jobs are properly matched.

Who Is Eligible?

All men and women of working age with substantial job handicaps including loss of hearing are eligible for these services. Any condition resulting from accident, illness, or other cause which substantially prevents or interferes with one's earning a living in accordance with his best ability would make the individual eligible for vocational rehabilitation. Some persons may have not only a hearing deficiency but also a "secondary disability," such as hernia, weak eyes, tuberculosis, emotional or mental illness, and the like, which also would be treated through the vocational rehabilitation service. Eligibility hinges on the following three conditions:

1. An applicant must be of work age.
2. He or she must have a substantial job handicap because of a physical or mental disability.
3. He or she must have a reasonably good chance of becoming employable or of getting a more suitable job through the services which the rehabilitation agency can offer.

It will be noted that the work situation, or employment, is emphasized. The reason for this is that the rehabilitation program is strictly vocational and is intended solely to make handicapped persons employable.

How Much Does the Client Pay?

Naturally, an eligible client wants to know how much the rehabilitation services will cost him. Here's the answer briefly:

He pays nothing for his medical examination, medical and vocational diagnosis, guidance, training, and placement.

To the extent that his financial condition will permit, he is expected to pay for medical, surgical, or psychiatric care, hospitalization, nursing care, drugs, hearing aids or other artificial appliances, tools, occupational licenses, travel and living expenses. If he can pay 25 per cent, he pays one-quarter of the bill. If he can pay half, he pays that. If he can pay 100 per cent, he pays the full bill. However, should he be unable to pay anything, public funds would be used to pay the full cost of whatever services are required to put him in condition to work.

In each case, the Bureau determines how much a client will pay. This is required under the State and Federal laws.

What Facilities Are Used?

The Bureau purchases rehabilitation services from existing facilities and medical care from regular doctors, specialists, clinics, hospitals, and other facilities—either public or private. No attempt is made to equip any one agency to provide the many services required in the over-all job of rehabilitation.

Training for clients is purchased or obtained from colleges and universities, public and private vocational and trade schools, correspondence schools, institutions with extension courses, and from tutors. In the case of the deaf and the hard of hearing, instruction in lip reading and speech correction may also be provided.

Special provisions are available for training disabled persons within industry. Such training provides for working at a job under conditions comparable to apprenticeship.

When and How to Apply

Application may be made at any time. Representatives of the Bureau of Vocational Rehabilitation of the State Department of Education will be glad to talk over with any handicapped person his vocational problems, whether immediate or future. For instance, a hard-of-hearing boy or girl still in high school may wish to plan now for work or training to be undertaken after graduation. A person who fears the loss of his job because his hearing is becoming more and more defective should consult the Bureau concerning possible work adjustment. Those seeking work may be advised concerning kinds of work suitable for their condition.

The individual may make his own application and need not wait to be referred by any person or agency. No formality is involved. Simply call at the nearest rehabilitation office, or, if that is not convenient, write asking for information and application blank.

Steps in the Rehabilitation Process

The services provided vary according to the individual needs of each client, but the normal step-by-step procedure is as follows:

1. He would call at the Rehabilitation office nearest his home (see list) or, if at a distance, write to that office.

2. He would be asked to fill out an application for service.

3. A Rehabilitation counselor would then interview the applicant concerning his educational, social, economic and general health background, his interests, aptitudes, job experience, and financial status to form a preliminary opinion of the client's eligibility for service. The counselor is the client's adviser in all problems and sees that all services are tied together throughout the rehabilitation process in the most beneficial manner for the client.

4. A qualified physician, in many cases the client's family doctor, examines his heart and lungs, and sees that a urinalysis, and similar tests are performed—in short, a thorough physical examination is given. This is to determine whether the client's general condition is such that he can become employable or benefit from the rehabilitation services which the Bureau might offer. Eligibility for rehabilitation depends to a great extent on the outcome of this examination. It also serves to uncover and analyze "secondary disabilities" if any exist, for which physical restoration and other services might be necessary.

5. A hearing test is given by a specialist. As a result of the hearing test, the specialist would decide whether the loss is progressive, whether its progress can be checked, or whether hearing can be improved. At this point, the specialist could tell whether a hearing aid would be helpful, depending on the job possibilities of the client.

6. A rehabilitation plan is then worked out by the counselor and the client. Selection of a suitable job objective, based on the client's abilities, aptitudes and interests, would be the first order of business. Then would be considered what services would be needed and where and how they should be provided. These might include securing a hearing aid, supplementary training in lip reading or speech correction, medical treatment if indicated for improvement either of hearing or of a secondary defect, and vocational training.

7. The next step would be carrying out the rehabilitation plan. Arrangements would be made to provide whatever services had been decided

upon. If training is to be included in the client's program he will be enrolled in the school best suited to prepare him for the chosen job objective, or training on the job or by correspondence will be arranged. As stated above, training is provided without charge regardless of financial status. It is given either to prepare the hard-of-hearing person for a job or to make him more advantageously employable through added skills and capacities. No matter what kind of training is given, it must be directed toward a definite job goal.

8. The client may require such auxiliary services as maintenance during rehabilitation, transportation, books or other training materials, occupational tools, equipment, and licenses.

9. Placement in a job to make the best possible use of the individual's ability and take into consideration his aural condition and temperament, and also to safeguard him against injury, is the next-to-last step.

10. Follow-up on the client's job performance for a reasonable time and help in making whatever adjustments may be necessary, to provide further medical or surgical care if needed, or to supplement training if required, is the final step.

Solving Occupational Problems

Vocational Rehabilitation service is obviously a valuable aid to the hard-of-hearing person in adjusting himself vocationally. He may have lost his job because the demands for his skill have disappeared as has been the case with many who specialized in war production. Or, he may not be able without additional training to keep pace with stepped-up procedures in machine-shop practice. Or, he may have suffered an additional disability which forces him to seek a new type of work. Or, he may have social or personal maladjustments which make him undesirable to employers. Whatever the cause, the State Rehabilitation service is responsible for providing the indicated training and other necessary services to make him a fully self-supporting, useful member of the community.

No "made work" is set up for those whom the rehabilitation agencies place in jobs. Employment is procured in private business and in government on the customary competitive basis. One of the principles of vocational rehabilitation, which is urged on the general public not only by counselors but by clients as well, is: "do not segregate disabled persons but assimilate them into the working population; do not set them apart from the rest of society as a group for whom special privileges must be sought."

Other Services of the Bureau

The Bureau of Vocational Rehabilitation makes every effort to further the welfare of the hard of hearing in other ways as well as through direct service to applicants. Some of its activities in their behalf are indicated in the following paragraphs:

School Officials and Teachers

The Bureau encourages school authorities to use every possible means for early discovery of hearing defects in children. The importance of doing so is obvious; prompt medical treatment may prevent permanent impairment; special instruction methods may be adopted which will facilitate their educational progress. The Bureau also offers aid to the schools in counseling students with physical impairments so that they may have preliminary instruction upon which suitable vocational training may be based. School authorities are informed concerning vocational services available through the Bureau and are urged to refer to it students or graduates who may need specialized training.

Employers

The Bureau is in constant touch with industry, and is continuously advising employers that hard-of-hearing persons make acceptable workers if adequately trained for suitable types of work. The large number who have been trained and are satisfactorily employed is proof of this statement. The Bureau also offers its service to employers in adjusting to new jobs those employees who become handicapped by impairment of hearing or otherwise.

Agency Co-operation

The sincere interest of the Bureau of Vocational Rehabilitation in the welfare of the handicapped insures its active cooperation with associations for the hard of hearing as with all other interested organizations and agencies. By working together much has been done and much more can and will be done for the co-ordinated program of prevention, cure, education, social adjustment, counseling, training and placement of those who need and can profit by the various services available.

The Public

Rehabilitation is one of the agencies active in educating the general public concerning the capabilities of the hard of hearing and other groups with physical impairments. These groups of handicapped persons differ not at

all from the general population in intelligence, skills, abilities, and other characteristics. There are among them proportionately just as many brilliant students, just as many capable workers. There is no valid basis for discrimination socially or vocationally. Whatever handicap a hearing defect may constitute can be overcome; their right to work and thus to gain and maintain economic independence is as unquestioned as that of any other citizen.

Research

Studies are frequently made by the Bureau covering various phases of the problems of the hard of hearing. Such studies increase the fund of knowledge as to feasible occupations, their successful employment; the improvement of lip-reading methods; the efficiency of hearing aids. It is the aim of the Bureau to become increasingly well informed in order that it may render increasingly better service.

Summary

The hard of hearing, like all other citizens, have an inherent right to work for self-support. They have a right to expect any necessary aid to overcome difficulties in obtaining employment. The state has recognized these rights and maintains the Bureau of Vocational Rehabilitation to make them effective. The Bureau's program of counseling, vocational training and placement, together with the supplementary services outlined above, is open to those who are vocationally handicapped.

The Bureau is sincere in its desire to assist physically impaired persons in their vocational adjustment; through its direct service to clients and its other services in their behalf it strives to open the gate of successful employment to them.

Inquiries are welcome. Applicants will be courteously received. It may be added that Vocational Rehabilitation has already been successful in aiding thousands of persons with physical impairments, including a large number of hard-of-hearing persons.

Vocational Rehabilitation Offices in California

Central Office

Sacramento, 705 California Street, Harry D. Hicker, Chief of Bureau

District Offices

San Francisco, 515 Van Ness Avenue, J. M. Dodd, District Supervisor
Oakland, 2059 Webster Street, L. O. Adams, District Supervisor
Sacramento, 705 California Street, E. L. Colby, District Supervisor
Pasadena, 30 North Raymond Avenue, J. O. Stanton, District Supervisor

Los Angeles, 357 South Hill Street, R. W. Feike, District Supervisor
Long Beach, 215 American Avenue, Andrew Marrin, District Supervisor

Branch Offices

Chico, 407 Main Street, Roland S. Applegate, Rehabilitation Officer
Fresno, 2404 Kern Street, Neil MacDonald, Rehabilitation Officer
San Bernardino, 491 Fifth Street
San Diego, 121 Broadway, Frank W. Vingoe, Assistant District Supervisor
Santa Rosa, 315 Rosenberg Building, Robert F. Held, Rehabilitation Officer
Stockton, 724 Bank of America Building, J. C. Waddell, Rehabilitation Officer

Local Offices

Modesto, c/o Capitol School Administration Bldg., J. A. Seaman, Rehabilitation Co-ordinator
Salinas, 110½ Homestead Avenue, E. L. Low, Rehabilitation Co-ordinator
San Jose, Room 28, San Jose High School Bldg., Dr. D. W. Thomas, Rehabilitation Co-ordinator
San Mateo, c/o San Mateo Junior College, R. T. Allan, Rehabilitation Co-ordinator
Santa Ana, 1104 West Eighth Street, Andrew J. Fuller, Rehabilitation Officer
Visalia, c/o County Superintendent of Schools, John H. Gearhart, Rehabilitation Co-ordinator

VOCATIONAL ADVICE FOR THE HARD OF HEARING

C. G. Bluett, *Assistant District Supervisor, Bureau of Vocational Rehabilitation, California State Department of Education*

Vocational adjustment need not be more difficult for the hard of hearing than for those who hear normally if common sense rules are learned and applied. Even though psychometrics may be used as the basis for vocational counseling, or psychiatry is used to restore emotional balance, either or both of these methods, in reality, are but technical aids to common sense. The aim of the counselor is to find out what an individual can do and help him to do it; the psychiatrist attempts to determine the cause of emotional disturbance, then encourage his client to face the facts and deal with them. If the hard-of-hearing person understands this from the beginning he may save himself unnecessary difficulties in making his adjustment and may never need assistance.

Other chapters in this Handbook deal with the advantages that should be accorded the hard-of-hearing young person. These include medical attention, lip reading instruction, speech training, and use of a properly fitted hearing aid. These are basic and of equal importance to young persons or adults. To the extent that these aids overcome the disability, the handicap is mitigated and the need for special consideration is decreased. If they are not enough, the rest is personal adjustment.

Young and old benefit by vocational guidance, consisting of thorough analysis by means of aptitude and achievement tests, interest inventory, and temperament analysis, followed by skillful counseling. The advice of an experienced counselor is of utmost importance for by the time the seriously hard-of-hearing person has learned for himself that which the counselor can make clear to him in the beginning, he may have become so entangled in his life situation he will believe himself unable to break the vicious circle and begin anew.

Opportunities exist for the hard of hearing in professions, agriculture, mechanics, commerce, personal services, the arts, social sciences, or any other large field of work in which men and women earn their living. In preparation the hard-of-hearing boy or girl should continue his general education as long as he demonstrates ability to assimilate the information for since success in later life correlates with the amount of education received, it is even more important that the handicapped individual secure a good education to insure his success than it would be if his hearing were normal.

After the young person has chosen the general field of work, he should give attention to selecting a job within that field of advancement. The job should be one in which good hearing is not primarily essential. It should be based on skill or specific information that may be used as a beginning job. Examples of such jobs are drafting for engineering; laboratory technique for medicine; bookkeeping, accounting, office machines, and typing for business; woodshop or machine shop for a trade; drawing or design and others which are considered later in this article.

This strictly vocational training should be carried simultaneously with the general course, and before the young person leaves the school he should be sufficiently well trained to secure employment in this well chosen beginning job. Otherwise, too often he considers his early jobs as temporary. He can charge off a failure to experience, but the period from twenty to thirty years of age may easily be used up in such experience; new responsibilities are often acquired during those years and in terms of getting started in a new occupation at the age of 30 he is already an old man. If the same period has been spent in well directed effort, at the age of 30 he has acquired considerable seniority, but he is still a young man in terms of advancement.

The Hard-of-Hearing Adult

The adjustments that the young person with impaired hearing has opportunity to learn early, as a natural or only method, the adult must learn as a substitute or alternative not so satisfactory as his previous mode of life.

Often the adult has developed resistance to change. The intuitive, flexible personality may make the adjustments in his stride, but the analytical, ponderous individual finds great difficulty. Either, or both, must have the faculty for realism; for if one breaks with reality, he becomes queer. There is no other method of bringing about rehabilitation than for the individual to utilize the aids that are offered him.

Occupations for the Hard of Hearing

One of the first questions a hard-of-hearing person asks is: what jobs are open to the hard of hearing? Early in 1934 the United States Office of Education sent out 322 investigators into 27 states and the District of Columbia to answer this and other questions.[1] Information was returned from 286 investigators regarding 19,580 deaf and hard-of-hearing persons, who were either employed at the time or had been employed recently.

[1] Elise H. Martens, *The Deaf and Hard of Hearing in the Occupational World*. Report of a Survey Directed by the United States Office of Education. United States Office of Education Bulletin, 1936, No. 13. Washington: United States Department of the Interior, 1937, Table 18. (Hereafter referred to as U. S. D. E. Study.)

The ages extended from 19 years to over 60 years. About 56 per cent of these persons claimed to hear loud speech, at least with an earphone, and 33.9 per cent of the total group had become hard of hearing after the age of 18 years. As to education 86.2 per cent had less than university education and 49.5 per cent had elementary school education or less. Surely this survey covered a typical group of hard-of-hearing persons.

It was learned that the hard of hearing and even the deaf were engaged in every one of the occupational classifications of the National Census, but that 43.6 per cent were employed in manufacturing and mechanical trades which was high in comparison to 28.9 per cent of the general population engaged in these occupations. There was a much smaller percentage than of the general population engaged in agriculture, fishing, and forestry, but this contrast probably is owing to the difficulty of gaining the needed information in rural areas and had it been secured, in all probability would have had a noticeable effect upon the other percentages. The comparative data presented as table 18 in the above study is shown below as table 1.

TABLE I

Comparison of Occupational Distribution of Deaf and Hard-of-Hearing Sampling With That of the U. S. Census of 1930

Occupation at Which Employed	Percentage of Total Employed in Each Occupational Field	
	Sampling of Deaf and Hard of Hearing, 1934	1930 Population (U. S. Census)
Agriculture, fishing and forestry	3.4	23.9
Manufacturing and mechanical trades	20.1 [2]	28.9
	23.5 [3]	
Transportation and communication	1.4	7.9
Trade	9.7	12.5
Public Service	.8	1.8
Professional Service	11.2	6.7
Domestic and Personal Service	9.8	10.1
Clerical Occupations	10.1	8.2
Total	100.0	100.0

[2] Skilled mechanics. [3] Operatives and laborers.

American Hearing Society Survey

One of the findings in the U. S. D. E. study was that the deaf had had less difficulty in retaining steady employment during the depression years than the hard of hearing, but this conclusion did not consider level or kind of employment.

About ten years later and during World War II The American Hearing Society [4] undertook its own survey among its members and friends.[5] Questionnaires were distributed throughout the United States and answers that could be tabulated were received from 562 hard-of-hearing persons. Of this number, 55.6 per cent were engaged in professional and managerial and clerical and sales and related occupations; 19.0 per cent were employed in skilled occupations and 25.4 per cent in other occupations. A breakdown of the differences between the two studies is shown in Table 2.

TABLE 2

COMPARISON OF NUMBER AND PERCENTAGES OF HARD-OF-HEARING PEOPLE ENGAGED IN OFTEN REPORTED OCCUPATIONAL GROUPS, IN TWO SEPARATE STUDIES

	U. S. D. E. STUDY		A. S. H. H. STUDY	
OCCUPATIONAL GROUPS	NUMBER	PER CENT	NUMBER	PER CENT
1. Operator, Mill or Factory	741	13.4	14	2.5
2. Clerk, Except in Store	465	8.4	77	13.7
3. Unskilled Labor	438	7.9	4	0.7
4. Teacher	220	4.0	48	8.5
5. Hotel or Domestic Servant	200	3.6	2	0.4
6. Salesman, Canvasser or Commercial Traveler	217	3.9	3	0.5
7. Accountant, Bookkeeper, Cashier	186	3.4	32	5.7
8. Retail Dealer	172	3.1	10	1.8
9. Owner, Manager, or Official in Plant	170	3.1	7	1.2
10. Machinist or Mechanic	119	2.1	32	5.7
11. Dressmaker, Seamstress	133	2.4	19	3.4
12. Real Estate or Insurance Agent	106	1.9	—	0.0
13. Janitor	105	1.9	1	0.2
14. Typist	105	1.9	25	4.4
15. Farmer or Farm Worker	95	1.7	10	1.8
16. Compositor, Linotypist, Typesetter, Pressman	91	1.6	12	2.1
17. Foreman or Overseer	78	1.4	1	0.2
18. Carpenter	77	1.4	3	0.5
19. Welfare Worker	84	1.5	10	1.8
20. Barber, Hairdresser, Manicurist	71	1.3	4	0.7
21. Housekeeper	61	1.1	16	2.8
22. Painter, Glazier, Varnisher	57	1.0	1	0.2
23. Forester or Forest Service	58	1.5	1	0.2
24. Plumber, Gas & Steamfitter, Boilermaker	55	0.9	3	0.5

[4] The name of The American Society for the Hard of Hearing was changed on June 16, 1946, to The American Hearing Society.

[5] Charles G. Bluett and Ada Morgan Hill, Report of the Employment Survey conducted by The American Hearing Society. Hearing News, Volume 14, March, April, and May numbers 3, 4, and 5. (Hereafter referred to as ASHH Study.)

TABLE 2—Continued

COMPARISON OF NUMBER AND PERCENTAGES OF HARD-OF-HEARING PEOPLE ENGAGED IN OFTEN REPORTED OCCUPATIONAL GROUPS, IN TWO SEPARATE STUDIES—Continued

OCCUPATIONAL GROUPS	U. S. D. E. STUDY NUMBER	U. S. D. E. STUDY PER CENT	A. S. H. H. STUDY NUMBER	A. S. H. H. STUDY PER CENT
25. Boarding or Lodging Housekeeper	53	0.9	—	0.0
26. Motor Truck or Tractor Driver	39	0.7	—	0.0
27. Attorney	37	0.7	—	0.0
28. Guard, Watchman, Doorkeeper	34	0.6	2	0.4
29. Physician	31	0.6	5	0.8
30. Electrician	29	0.5	1	0.2
31. Office Machine Operator	28	0.5	13	2.3
32. Nurse	27	0.5	9	1.6
33. Draftsman	26	0.5	10	1.8
34. Baker	24	0.4	3	0.5
35. Librarian	23	0.4	4	0.7
36. Engineer (Stationary)	22	0.4	—	0.0
37. Shipping Clerk	22	0.4	3	0.5
38. Shoemaker (Cobbler)	22	0.4	4	0.7
39. Civil Engineer (Surveyor)	21	0.4	—	0.0
40. Clergyman	21	0.4	—	0.0
41. Tailor	21	0.4	1	0.2
42. Cook	19	0.3	4	0.7
43. Electrotyper, Lithographer	19	0.3	—	0.0
44. Porter	17	0.3	—	0.0
45. Cabinet Makers	15	0.3	1	0.2
46. Milliner	14	0.3	—	0.0
47. Buffer, Polisher, Grinder (Metal)	14	0.3	1	0.2
48. Waitress	12	0.2	—	0.0
49. Upholsterer	9	0.2	1	0.2
All Other	636	14.7	165	29.4
Total	5539	100.0	562	100.0

Comparison of the figures reveals that the percentages are quite similar, but noticeable differences may be seen in a few of the groups. For example, in the A. S. H. H. Study there were smaller percentages in the groups: (1) Operator, mill or factory, (3) Unskilled labor, and (6) Salesman, Canvasser or Commercial Traveler; whereas, there were larger percentages in the groups: (2) Clerk, except in store, (4) Teacher, (7) Accountant, bookkeeper, cashier, (10) Machinist or mechanic, etc. These are desirable differences and they are not chance differences, for those included in the A. S. H. H. Study tended to be younger, to have more education and to have lost their hearing later in life than those included in the U. S. D. E. Study. In the same study

it was shown that those who held professional and managerial positions tended to have had more education, to have lost their hearing later in life, to rate themselves as above average in lip reading, to wear an earphone all the time, to have entered their present occupation before becoming hard of hearing or at least before becoming severely handicapped, and to have secured their own jobs more often than those in other occupational classes. Some of these advantages a hard-of-hearing person can not secure for himself, but others he can and it would appear that these represent the common sense rules of guidance; namely, that a hard-of-hearing person should secure all the education his innate capacities will permit him to assimilate, wear an earphone all the time, strive to become a skillful lip reader, enter upon a definite occupation for which he has made preparation early in life and continue in it. Thus he not only assures himself of employment but of desirable employment.

Favorable and Unfavorable Occupations

While it is true that job lists do not solve the problem for individuals, it is also true that there are certain jobs which seem to accommodate the hard of hearing more readily than others. Referring to ratings in his test of vocational interests, Dr. Edward K. Strong has said that one who secures a high rating on one of the occupational scales should consider well his reasons for not entering into that occupation, but if he receives a low rating he should consider well his reasons before deciding to enter into that occupation. The same consideration might be applied by the hard of hearing before entering into an occupation in which others with hearing handicaps have often had difficulty or before rejecting an occupation which seems to be favored by those who have lost all or part of their hearing. If one has only average ability but selects an occupation in which hearing is a primary requisite he is likely to find himself barred from advancement and if he has better than average ability he may still find himself working under a strain that undermines his efficiency and possibly his health.

In the A. S. H. H. Study some of the jobs favored after recognizing a hearing handicap were:

Professional, Managerial, Sales and Related Occupations:

- Accountant
- Architect
- Artist
- Business for self
- Chemist
- Dental Technician
- Dentist
- Dietitian
- Draftsman
- Editor
- Electro-therapist
- Engineer (electrical)
- Laboratory Technician
- Librarian
- Pharmacist
- Photographer
- Physician
- Sign Writer
- Social Worker in Organization for hard-of-hearing adults
- Statistician
- Teacher of Lip Reading

Clerical, Sales and Related Occupations:

- Account Clerk
- Actuarial Clerk
- Bookkeeper
- Correspondence Clerk
- File Clerk
- Hearing Aid Consultant
- Office Machine Operator
- Proof Reader
- Shipping Clerk
- Statistical Clerk
- Stock Clerk
- Typist

Skilled Occupations:

- Assembler
- Baker
- Blue Print Operator
- Cabinet Maker
- Dry Cleaner
- Electrician
- Electroplater
- Engraver
- Lens Grinder
- Machinist
- Meat Cutter
- Auto Mechanics
- Auto Body and Fender Mechanic
- Sheet Metal Worker
- Milliner
- Optician
- Painter and Decorator
- Photographic Processor
- Printer
- Repairman, Electric Motors
- Repairman, Hearing Aids
- Repairman, Shoes
- Repairman, Typewriter
- Seamstress and Dressmaker
- Tailor
- Tile Setter
- Tire Builder
- Tool and Die Maker
- Upholsterer
- Warehouseman
- Weaver

Other Occupations:

- Barber
- Beauty Operator
- Blacksmith
- Candy Maker
- Chocolate Dipper
- Cook (domestic)
- Dairy Hand
- Dishwasher
- Factory Hand
- Farmer
- Foundry Hand
- Forest Service
- Florist
- Gardener
- Hosiery Knitter
- Janitor
- Jewelry Maker
- Landscape Gardener
- Laundry Worker
- Power Sewing Machine Operator
- Presser, Clothes
- Punch Press Operator
- Riveter
- Roofer
- Textile Worker
- Tractor Driver
- Welder

It should be noted in the above list that the product or service is paramount, and though the necessity for hearing is not eliminated, it is secondary. The following list of jobs are among those which, apparently, were given up as being too difficult and might be looked upon as dubious choices for hard of hearing, since hearing is of primary importance in fulfilling the duties of the jobs:

Professional and Managerial:

- Master Mariner
- Minister
- Musician
- Naval Officer
- Nurse
- Professor (University)
- Radio Operator
- Reporter (Newspaper)
- Social Worker
- Teacher, High School
- Teacher, Elementary
- Teacher, Dancing
- Teacher, Languages
- Teacher, Music

Clerical, Sales, and Related:

- Canvasser
- Hotel Clerk
- Retail Sales Clerk
- Salesman (outside)
- Secretary

Skilled and Other Occupations:

Railroad Fireman	Matron (boy's home)	Taxi Driver
Housekeeper	Soda Fountain Clerk	Watchman
	Soldier	

Some of the jobs listed in the "unfavorable" list actually had comparatively large numbers engaging in them after becoming hard of hearing, but the stories they told were those of hardship. These people continued in the occupation of nurse, secretary, teacher, salesman, housekeeper, because they knew the job and would rather continue in it than make the effort to use their experience in some equally well paying work in which hearing was not a primary requisite. In some cases this decision was probably justified because of age, security through seniority, or other factors. In others it appeared to be a matter of not knowing of other opportunities, lassitude, hopelessness, or even vindictiveness; that is, they fought back thoughtlessly and felt injured that anyone should think they were not adapted to the work. Sometimes it is a difficult choice when, because of no fault of one's own, he must begin again and give up that which has been achieved and which rightfully would have placed him now in position to advance within his field.

Job Adjustment

Age, education, family responsibilities, geographical location, work experience, economic situation both personal and the prevailing market for labor, length of service, and benefits that accrue with service, attitude of family and of friends, and the clearness with which some other opportunity is seen, as well as ability to hear with an earphone and to read lips, all have their place in the thinking of the hard-of-hearing person who considers changing his job. Then too he must make an inventory of himself. One who is established in an occupation can depend upon things learned to "get him by," long after he has ceased to learn new ways of doing things; but one beginning a new occupation must be able to acquire new skills and information. He is looked upon critically and openly criticized. He must prove himself anew, and he is likely to be under-rated.

After the age of 25 or 30 man's faculties begin to deteriorate; not rapidly, but perceptibly. This applies to function, timing and flexibility, not necessarily to judgment or information. Learning new skills, however, becomes more difficult than rearranging existing information or applying learned skills to new tasks.

The temperament pattern has become well established in an adult, and often is not well integrated. Emotional instability combined with decreasing efficiency as well as hearing is an undesirable combination. More and more

clearly it is understood that rehabilitation of a hard-of-hearing person involves the over-all aspects of his relations to life—a complex problem.

Intelligence, aptitudes and temperament are expressed as interests and these in turn have been conditioned by experience. The hard-of-hearing person like any one else starts with a given constitution, mental and physical, with certain predispositions. The chance element lies in his experiences and their reaction upon him, but even his experiences are to some extent determined by his predispositions. There are handicapped persons who can take the above factors into consideration, then plan a course of action and carry it out. We quote here from a most remarkable letter which accompanied one of the A. S. H. H. Study questionnaires. It well portrays the spirit of determination job adjustment sometimes requires.

"In 1921 I was employed by the ..... State Game Commission. When my ears began to fail, about ten years ago, I was given other work in the same office. Although I no longer took dictation, I wrote from fifteen to thirty letters per day and was responsible for cash and license stock. Repeated requests for salary adjustment were refused on the basis that I was not worth any increase because I was hard of hearing. I felt that I was underpaid for the amount and quality of work that I was expected to do but I was afraid that I could not hear well enough to succeed in a new position.

"Last October, I came into the Outfitting Department of the ..... Iron and Steel Corporation as general office help. After more than twenty years spent at a desk, it was hard on a woman of 47 years to work out of doors in mid winter; to be on her feet eight hours a day without an opportunity to sit down; to climb up and down endless ladders; to search scrap piles for material; to handle unfamiliar tools, etc. My feet and legs were just beginning to get used to the increased demands on them when my boss offered me an inside job. I was only too glad to come in out of the January weather, if the superintendent thought I was capable of handling the responsibility. There is constant consultation with the leadmen and quartermen and innumerable telephone calls to warehousemen, engineers and expediters. My hearing aid takes care of the face-to-face conversations and the company has installed an amplified telephone for my use. I have had two unsolicited raises in pay and am now drawing a little better than twice the salary that I received from the State Game Commission."

There are many, who, if they really stop to consider all the factors involved will make the best of what they have and this may be a wise course of action, for it is less difficult to upgrade one's self on the job through self study, correspondence training, or evening school or to arrange a change of duties within an organization than to enter into a new occupation or even to secure employment within a new organization.

The attitude of employers toward the physically handicapped has changed greatly as a result of World War II experience. Since World War I the American Hearing Society [6] has been educating employers and the public regarding the possibilities of the hard of hearing as employees. Since 1921 the Federal and State Rehabilitation services have proved the practicability of training and placing the handicapped, and the United States Employment Services are now stressing selective placement for the handicapped. Studies have been conducted within industry which prove beyond doubt that when the disabled are properly placed they make better than average employees.[7] In spite of all this effort on behalf of the handicapped, a hearing loss is still an absolute barrier to employment in some organizations. In others it is a barrier to anything other than routine operations. Advancement generally leads to supervision of others and this is particularly difficult for the hard of hearing, for those being supervised have a ready made weapon available if they are displeased. "He cannot hear what I say," is enough to place the burden of proof upon the hard-of-hearing supervisor. It is very easy to assume that the disabled person cannot do the job as well as one who is not disabled, and unless the handicapped individual can give much better than average accounting of himself he is very likely to be passed over when opportunity for advancement arises.

So it is that many hard-of-hearing persons find themselves seeking new employment, not because they have considered all factors and have made a decision, but because they have quit their jobs in irritation and protest, or as marginal employees have been forced out in a tight labor market or perhaps have failed again because they have never been properly adjusted.

Regardless of the cause of unemployment, the hard-of-hearing person should seek the assistance of the State Rehabilitation Services. The approach to these services should not be starry-eyed wishfulness, sardonic skepticism, apathetic acquiescence, bullying, or daring. It should be objective co-operation. The hard-of-hearing person should expect to receive professional courtesy, sympathetic investigation, practical advice and material assistance; including a hearing aid if needed, lip reading instruction if he will accept it, vocational training if required, minimum maintenance if unavoidable, and any other pertinent assistance, including physical restoration when indicated, and always assistance with placement. He may expect to be surveyed by means of tests which will compare him with the general population and

[6] Formerly American Society for the Hard of Hearing; also American Federation of Organizations for Hard of Hearing.

[7] *Impaired Workers in Industry*. Bulletin No. 857; Prepared by United States Department of Labor, Bureau of Labor Statistics, Industrial Hazards Division, in co-operation with the Veterans Administration, January 1946.

indicate at about what level he may expect to be able successfully to compete in the vocational world and in what vocational direction he should travel.

If he knows better than the impartial investigation reveals, but has never demonstrated it he cannot expect the counselor to be convinced, or if the plan he proposes for himself is not realistic he cannot expect enthusiastic cooperation. An individual can take a chance upon himself and lose and has only himself to blame, but the rehabilitation services are expected to win in each instance. The rehabilitation plan must begin with the job that exists today and the individual may look toward the future.

The past should be analyzed to determine the cause of extreme dissatisfaction or of failure, and the safest and best plan for the adult is to begin a divergence from the environmental situation which was wrong, not relinquishing the experience gained, but adding to it, supplementing and improving upon it with new and allied information or skills, and seeking a new environment in which to apply these additional assets. This is a plan in which the rehabilitation counselor can join heartily and in which he can be most effective for his experience in locating existing opportunities, in selecting training facilities for definite objectives, his ability to provide necessary assistance can make such a plan workable, whereas the individual alone might not see the opportunity, might not know of the training facility, or not be able to supply the moderate financing required.

A young hard-of-hearing man has earned his living by washing dishes in a restaurant for many years. As a hobby he tinkers with hearing aids, and is always on the verge of a revolutionary discovery. He has been given tests in mathematics, and has an excellent command of that subject, and of principles of electricity. His general abstract intelligence is excellent, but he has very little formal education and no trade training. He has been advised, even urged, to undertake a course in electric shop and become a core winder or to repair electric appliances. He gives lip service to the plan but cannot take action, and fails to follow through. Months later a letter arrives discussing the theories of electronics or perhaps the philosophy of the hard of hearing in the economic system, but no indication that he has given any further thought to preparing himself for an occupation. The counselor knows that to place this man on a learner's job would result in failure for he would try to twist the duties of the job into his own peculiar channels, would become lost in reverie and would be discharged. He might be said to have schizophrenic tendencies; one who is ingrown, has feelings of difference, and is unable to identify himself with reality. It is his temperament, not his abstract intelligence nor his hearing, that causes him to continue with a routine operation in which his mind may dwell upon its own preoccupation. This man also has the insight to know his own weakness.

A musician at age 38 finally decided to give up music. He applied for and was given training in art, for he demonstrated excellent esthetic judgment, imagination, a stable temperament, and interests comparable to successful artists. To supplement his income he worked evenings in a furniture store helping with refinishing. Soon he knew a great deal about refinishing, also he won a scholarship in the art school. He switched his program to studying art evenings and working days in the furniture store, not only refinishing but making card signs. His interest in furniture grew; he studied design, the manufacture of furniture, and finally dropped out of art school to open his own business with a salesman partner. They deal only in fine furniture, buying, refinishing, upholstering, redesigning, selling, and decorating. They have now been operating successfully for several years.

A woman who had been a successful teacher decided she would become a teacher of lip reading in the public schools. She was told she could not secure a certificate to teach hard-of-hearing children but if she could organize a class of adults she would be commissioned to teach them. Instead of spending her time in locating and interesting hard-of-hearing adults in a class for themselves she insisted on teaching children, harried the superintendent of schools, talked loudly and vociferously about discrimination to any one who would listen, used names and organizations as references indiscriminately, cried copiously and otherwise displayed an hysterical temperament to the embarrassment of those who desired to help her and of course defeated them and herself.

A woman who had been so busy raising two children left her by a former husband she had not had time to prepare for or find anything but housework, finally arrived at "breathing space." She applied to the Bureau, explaining that her difficulty in hearing doorbells, telephone bells, and quietly given orders, interfered with getting the best jobs as housekeeper. She was then 35 years of age, but demonstrated excellent clerical aptitude, good general intelligence, and vocabulary, numerical facility and manual dexterity. She had completed the tenth grade in school, was of good appearance, and obviously energetic. A new hearing aid, small maintenance allowance, and four months in business college learing to operate the comptometer was all that was needed to secure employment for her in that work.

These are examples of success and failures in rehabilitation. Examples could be given to portray more complex problems and many shades of differences in the combinations. In none of them would it be possible to put responsibility upon the hearing loss itself as the sole problem. A severe hearing loss may interfere with educational attainment, with social and marital adjustment, with full enjoyment of some leisure pursuits, with gaining advancement

on the job, and these difficulties may react with great force upon the personality and emotional life of the unfortunate person. A hearing loss will not reduce the individual's innate intelligence, aptitudes (when hearing is not involved), or ability to produce a good product. The hard-of-hearing man or woman must face himself and his environment objectively, be sufficiently mature to accept his situation as it is and willing to utilize the aids that are his. After all only he can will to train his voice so that it will not betray him; train his eyes to watch the lips; use a hearing aid to best advantage; choose the job that emphasizes his strength and not his weakness; prepare for it, keep abreast of it or ahead of it; discount his emotions and above all keep trying. As one hard-of-hearing person has put it, "I give life and the job the best I have and in return life and the job have been good to me."

AN INSTITUTIONALIZED PROGRAM OF REHABILITATION FOR THE HARD OF HEARING

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Rehabilitation is an all inclusive term and, when applied, must meet the needs of the individual. In preparing an individual to secure his place in society it is necessary to take a careful inventory of his physical well-being, mental capacity, aptitudes, educational and vocational background, personality, and emotional stability. Civilian agencies do not emphasize an institutionalized program to accomplish this goal but utilize existing facilities wherever they can be found. Consultant physicians, psychologists, and others must be sought to complete the diagnosis. Medical treatment, physical restoration, education and vocational training must be obtained from various sources. Theoretically, at least, the best facilities in the United States are available to a rehabilitation client. In practice, however, local facilities generally are used. When all facilities are not available under one roof the civilian rehabilitation agency acts as co-ordinator, arranging for the client various appointments in the vicinity.

PREPARATION AND LOCATIONS

During World War II an institutionalized rehabilitation program was established for the acoustically handicapped servicemen. The Surgeon General's Department sought to develop a complete program at three strategically located general hospitals in Santa Barbara, California; Butler, Pennsylvania; and Chickasha, Oklahoma. This chapter proposes to present a brief resume of how the Army program was administered at Santa Barbara. Whatever implication this method may have for a program of civilian rehabilitation, let it be preserved and considered by those interested in the rehabilitation of the acoustically handicapped.

The magnitude of the war became apparent in the first few months of active hostilities; casualties were returned to the States in large numbers. Many of these were aural casualties. Something had to be done to rehabilitate these men that they might return to duty or revert to a successful civilian status. The Surgeon General's Department had learned from experience that it could not undertake this task alone, and it immediately consulted leaders in the education, medical and technical fields who were specifically concerned with helping the hard of hearing. Technical men from various hear-

ing aid companies, research laboratories, the American Society of the Hard of Hearing, [1] The Volta Bureau, and many other agencies volunteered to assist.

Walter Reed Hospital became the first center for the rehabilitation of all sensory handicapped. Soon, however, the need for segregation of patients and a larger scale program was recognized. Hoff, Deshon, and Borden General Hospitals were selected. The programs were inaugurated almost simultaneously. Although each center varied in its administrative procedures, the programs were similar.

The organization of the rehabilitation program at Hoff General Hospital was a delegated responsibility of the Commanding Officer of the hospital, a medical man. An immediate inquiry was sent out to civilians and military personnel who were experienced in the work with the hard of hearing. Two civilian specialists were obtained to assist with the actual planning along with acoustic technicians selected from the armed forces. Courses in lip reading were organized, and soon patients began to arrive.

With the installation of acoustic equipment, specially designed for the testing of hearing and the fitting of hearing aids at the Central Institute for the Deaf, the technical and educational phases of the program began to expand. Hearing aids were first obtained on purchase orders from local dealers; later they were contracted through regular channels. With the fitting of these aids there grew a need for auricular training to teach the patients how to use the aids and gain maximum benefit from them. Then there was recognized the need for speech training for those deafened patients whose hearing loss represented a potential speech deterioration and special speech correction for the many servicemen who had speech defects. Most of these defective speech cases had been hard of hearing long before their induction into the service, as were 70 percent of the patients admitted to Hoff General Hospital for this particular rehabilitation program.

Facilities and Program

A heretofore disregarded group of "deafened" patients presented the hearing center with another problem. Considerable number of patients admitted to the hospital for defective hearing were discovered to be handicapped with what has been termed "psychogenic" deafness. Briefly, this may be described as a psychological loss of hearing brought on by any number of factors, such as fear, anxiety, persecution complex, and even an anti-army or anti-social attitude. Through the combined efforts of the hospital psychiatrist and the psychologist many of these cases were "cured" or had that psychological element which caused the severe loss removed. Several of these

[1] Name changed to "The American Hearing Society" on June 16, 1946.

cases admitted having been hard of hearing from childhood. Final audiograms made after treatment for psychogenic deafness often revealed a "true" loss of hearing in these cases.

Let us summarize, briefly, the rehabilitation program offered to the hard-of-hearing servicemen. The average length of time they were on the program was eight weeks. During this time each man received accurate audiometric tests, thorough physical and otological examinations, expert educational, psychological, and vocational counseling, a carefully planned program of individual and group lip reading, speech and auricular training, expertly fitted hearing aids and, last but not least, the assurance to take his place alongside normal hearing individuals.

Although this program was institutionalized, every effort was made to permit the patient to mingle with people, socially and vocationally, thus building within himself confidence and assurance. Patients whose families were in town were permitted to live at home. Men with hearing aids were encouraged to wear their aids everywhere, while driving, at the theater, in sports, at church, at social gatherings, and at home when on furlough or leave. To ease the situation at home, special letters were sent to their families suggesting ways to assist the man in making an adjustment to his handicap. In this matter, considerable help was rendered by the American Red Cross, who co-operated fully with the Hearing Center's program. Societies for the Hard of Hearing made several contributions to the development of the program.

At a time when there were 250 patients on the program, divided into eight groups of approximately 30 per group, each in its particular week of the program, the hospital was utilizing a full staff of teachers, technicians, and medical officers. There were two otologists, two psychologists, two vocational counselors, one acoustic expert, and four technicians, three secretaries (one medical—2 academic), one administrative officer, three supervisors (lip reading, speech and auricular training), 15 lip reading teachers, five speech correctionists and four auricular training instructors.

A rehabilitation program of this type may be termed institutionalized. It represents an eight weeks' program specifically designed to assist the individual to "find" himself and build a foundation of lip reading, speech, and training in the use of his or her hearing aid. The courses of study were concise, applicable to everyday life, and conducive to social, mental, and vocational readjustment. Many comments have been passed by interested persons as to the plausibility of such a Hearing Center for the civilian hard of hearing. Dr. Karl Meyer of the Hooper Foundation visualized a Hearing Clinic, complete in every detail, to which individuals might be sent for help. Here, the medical profession could hold clinics and research laboratories in otology,

operating in co-operation with a local hospital staff. The ideal location would be near, or affiliated with a college or university, affording opportunity for internship and a training program for teachers of the deaf and hard of hearing. The college department of acoustic-physics would be able to carry on research in hearing aids, audiometry, and electro-acoustics. The academic staff of teachers, psychologists, and vocational counselors should be large enough to accommodate all patients without crowding classes or discussion groups.

Possible Future Application

Civilian Centers of this type might be maintained through state, federal and private endowments. Fees might be required of all patients who could afford the program or any services derived from any part of the program. Fullest co-operation of hearing aid companies would be mandatory. Technicians, whose responsibility it is to test hearing, fit hearing aids, and make ear molds, might receive valuable supplementary training in an exchange system with those companies who manufacture audiometers, hearing aids, and plastic ear tips.

Clients desirous of receiving services from such a center would be drawn from all walks of life, referred by physicians, industries, schools, hearing aid companies, Veterans' Administration, and the State Bureau of Vocational Rehabilitation. The summer months could afford further opportunity for children to receive assistance. A special program for children could be organized along with recreation activities. Dormitories and feeding facilities should be provided those clients who live out of town.

The Metropolitan Hearing Clinic in Los Angeles, a Community Chest Agency, is the first attempt on the West Coast to develop an institutionalized program for the acoustically handicapped. This program should prove invaluable to all men, women and children with impaired hearing. One program is not sufficient to render service throughout California or the West. Several should be made available to stimulate and further the hearing conservation programs and rehabilitation programs now in operation.

THE HARD OF HEARING FROM A PUBLIC HEALTH STANDPOINT

Guy P. Jones, *Former Chief, Division of Vital Statistics, California State Department of Public Health*

Professor C.-E. A. Winslow of Yale University has defined public health as "the art and science of preventing disease, prolonging life, and promoting physical and mental efficiency through organized community effort." This is a broad definition and might include almost every attribute that can contribute to human comfort and welfare. Comparatively speaking, the art of public health is new; and so far, its chief objective has been the control of the communicable diseases and the correction of environmental defects that might have to do with the rise and spread of such diseases. It is only recently that public health administrators have extended their field of operations to cover the physical examination of children and some adults and the adoption of measures that might lead to the correction of physical defects revealed through examinations. Heretofore, little has been done by public health agencies for the direct relief of physical handicaps in children, but there is now a growing tendency toward the development of facilities to relieve physical handicaps in the younger generation. This presents a hopeful sign for the hard of hearing; but it does not present a panacea, nor does it offer definite assurance of relief from any or all public health agencies.

It has been known for many years that impaired hearing often occurs among individuals who have suffered from respiratory infections, such as measles, diphtheria, scarlet fever, influenza, and pneumonia. If it were possible to prevent the occurrence of such diseases, many cases of hearing impairment might be prevented. Some of these diseases, such as diphtheria, can be definitely prevented through the application of immunization procedures, and scarlet fever is, to a limited extent, amenable to control through modern methods of prevention. In the immediate past, great advances have been made in the treatment of pneumonia and through the use of newly discovered products, a very large proportion of cases of pneumonia may be cured.

There can be no doubt that many cases of impaired hearing are preventable through the efficient control of these respiratory infections. It is the common experience of otologists that a large proportion of cases of impaired hearing follow attacks of communicable diseases such as measles, scarlet fever, influenza, whooping cough, pneumonia, and epidemic cerebrospinal meningitis. It is probable that a considerable number of potential cases of impaired

hearing might be prevented through frequent and regular examination of the hearing by competent otologists. Every child who may have suffered from a respiratory infection should have thorough and complete physical examinations for at least two years following each attack of such diseases. Special attention to the hearing mechanism following such attacks might produce noteworthy results in the prevention of hearing impairments. This is in addition to the audiometric test, which, by all means, should be carried on as a routine procedure for all school children. Unfortunately, many cases of impaired hearing are not discovered until the child enters school and receives the audiometric test. If regular physical examinations following attacks of respiratory infections, including audiometric tests, were given immediately following such attacks and regularly thereafter, valuable time might be saved in the application of treatment that would inhibit the development of the impairment.

Child Health Conferences and Clinics

In most of the larger cities, through the use of public health nurses and medical examiners, routine services such as outlined above are provided. In the rural districts of the state where such facilities are lacking, the Bureau of Maternal and Child Health, the California State Department of Public Health, conducts conferences and clinics where physical examinations are given to children for the purpose of discovering physical defects and offering recommendations for their correction. During recent years the application of audiometric tests to children in attendance upon such conferences and clinics has become a common procedure. Unfortunately, in many of the poor and sparsely settled communities, these services are not generally available. The state endeavors to cover the field, but is unable to provide the skilled services that are indicated in the treatment of individuals in whom physical defects have been discovered.

Aside from the respiratory infections, there are many other conditions that lead to hearing impairment. It is highly important that the whole child be examined, not merely his ears, nose and throat. The factors involved in the production of impaired hearing in children are manifold. Disturbances in the glandular system, malnutrition, congenital defects, abnormalities in growth of the bony structures, and many other factors may be involved in hearing impairments. For this reason, it is important that every child, regardless of illness from communicable diseases, be given thorough, regular, and competent medical examinations during the early years of his life.

There is a tendency to place too much emphasis upon the audiometric test. Actually, this test is only a means through which cases of definite hearing impairment may be discovered. The complete physical examination, however, including the audiometric test, is much more comprehensive and

if available might lead to the earlier discovery of hearing deficiencies. Needless to state, the extension of facilities for the early detection of such cases is of the utmost importance in the prevention of the development of hearing defects that may become more acute in adult life.

Provision of Health Care for Hard-of-Hearing Children

Through State Crippled Children Services, programs have been developed throughout the country for medical care to physically handicapped children. The scope of these programs, (which are partially financed by Federal Social Security Funds and partially by state and local appropriations), varies considerably. The basic program is usually remedial care for the orthopedically handicapped child, but many states have developed programs of much greater flexibility, including medical and surgical care for children suffering from cerebral palsy, correction of visual handicaps, medical care for children with rheumatic fever and, in some states care for handicaps in hearing which can be arrested or corrected with treatment or provision of appliances. California does include in its administrative definition of conditions eligible for care through Crippled Children Services auditory defects requiring surgical intervention or prolonged treatment to prevent extension of the handicap.

Medical Attention for the Hard-of-Hearing Adult

Hard-of-hearing adults who are financially able to provide themselves with the services of a skilled otologist can very often obtain a certain relief from their handicaps. It is advisable for adults with impaired hearing to consult otologists at regular intervals in order that any development in their impairment may be noted and efforts made to prevent any progression. Unfortunately, the services of the highly skilled otologists are not always available to individuals who are financially unable to obtain such services. Nevertheless, there may be facilities in the community for the treatment of hard-of-hearing individuals who are unable to pay for treatment. The medical schools in San Francisco and Los Angeles maintain clinics where individuals who are unable to pay for treatment may receive attention upon the payment of minor fees. The county hospitals and some of the health departments in the larger cities also maintain clinics for those who are unable to pay. To be sure, under a practical scheme of health insurance, such services might be readily available to all, but as yet no satisfactory health insurance project has been developed for the benefit of all of the people.

Some group organizations have been developed by which selected individuals may obtain such services. It should be recognized, however, that the services provided under this method are general rather than specific, and the

special services such as those that might be provided by otologists are not always available. Nevertheless, there are many competent otologists whose skilled services are available in public clinics.

Friends of the hard of hearing who desire to extend medical services in the prevention and treatment of impaired hearing might well survey the facilities in their communities in order to determine the extent of medical services that may be available at the present time for those who are unable to pay.

Hazards to Hearing for Workers in Industry

The development of industries in the United States is phenomenal, particularly the development of heavy metal industries. Noise as a factor in the production of hearing impairment among men who work in these industries is of importance. Industrial hygiene has become an integral part of the public health program and services in industrial plants cover such factors as ventilation, lighting, harmful gases and dust, lacquers, paints, chemicals and other products that may be harmful to the health of the industrial workers. Recently, more attention has been paid to those industrial factors that may have to do with the production of hearing impairments, chiefly noise. It is important, that in this industrial age, we give due recognition to all of those factors in industry that may produce hearing impairments. Some of these hazards in industrial plants are as great, if not greater factors in the production of hearing impairments than are the simple noise nuisances. Some of these industrial factors may be enumerated as follows:

Harmful noises may accompany the running of machinery. They may be caused by vibration, din, the action of transmission gears, defective driving belts, of hammers and saws, and in connection with the transportation of materials.

Sounds of higher pitch, shrill but not necessarily loud, may produce more injury than low deep sounds. The din in boiler making work is more injurious than the roaring in cotton-spinning mills. The reports of small caliber artillery and machine guns are more injurious than the boom of big guns.

The grating of saws or files when the tone is of a painful nature may be particularly injurious to people of nervous temperaments. The time of exposure to such noises is also important. Noises that last the longest are the most harmful, and in the noisy trades, workmen who suffer most are those who have been exposed to the noises for the longest time. Work within closed walls is more injurious than in open air, such as hammering inside of a boiler.

There are also predisposing factors such as the effect of dust, poisonous substances such as mercury, carbon bisulfide, and particularly lead, irritant or acid vapors, smoke and poisonous gases which seem to show a predilection

for the terminations of the auditory nerves. Excessive changes in temperature and pressure are also predisposing factors to ear injury. Noises and vibrations may also cause injury to hearing and may also affect the nervous system.

Workmen who desire to protect their hearing may wear ear tampons of compressed wool, moistened with some greasy substance such as vaseline. The protectors must be removed from time to time to allow ventilation. There are also ear protectors, but the ones made of metal are generally undesirable because of the injuries that may result through breaking. Protective helmets are used only for special activities, as workmen dislike to wear them and find them generally uncomfortable because of weight or pressure.

Men who work in noisy industries should be given regular medical examinations, including examination of the ears and hearing mechanism. Frequent shifts, changes of occupation or intervals of rest may be indicated. In some manufacturing plants noises and vibrations may be reduced greatly by covering walls, ceilings and floors with insulation products such as felts. acoustical plasters, and by the special installation of machinery.

RESEARCH IN DEAFNESS

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RESEARCH IN DEAFNESS COVERS A WIDE FIELD

The more recent developments in the various medical and other sciences have made possible tremendous advances in our knowledge of the physiology of hearing, as well as of several other branches of otology, the types and degrees of deafness and their causes, prevention, amelioration or cure. We must cease thinking of the ear as an isolated organ. Its normal function is dependent not only upon local conditions but also upon those in various other parts of the body. Furthermore, we must realize that its malfunction often has direct repercussions upon other physiological processes such as the production of speech and many of those personality factors dependent for normal development upon a relationship between adequate hearing and normal but often unconscious mental processes. From all this, it becomes evident that the field for study of hearing and its impairment is very broad. I can briefly recapitulate only a few of the studies under way in the United States, Canada and Europe as disclosed in private reports and in journals devoted to ear, nose and throat, bacteriology, physiology, experimental psychology, biochemistry, acoustics, electrical engineering, heredity and others including those devoted to sociology. These studies are frequently initiated and sponsored by organizations devoted exclusively to research in deafness.

SOME METHODS USED IN RESEARCH

In order thoroughly to understand the hearing apparatus, its development has been studied in our ancestors all the way up from fishes and amphibians to man. (Even grasshoppers can distinguish between the strident notes of very high tones emitted by their own species and those of other grasshopper species.) It is important to know the embryological development of the various anatomical structures. This subject is receiving adequate attention by the study of human embryos from the stage of ten millimeters to that of the eighty year old adult. This type of investigation serves as a basis for evaluating abnormal changes in bone or other tissues and aids in determining the origin and site or sites of predilection of otosclerosis—the disease which causes such devastating effects, particularly in the middle ear. Attempts have been made to produce otosclerosis in animals but without success, though other very similar bone diseases have been produced experimentally.

Other microscopic research is applied to every one of the finer structures of the ear, cells of all kinds of tissue, of muscle, bone, cavity linings, and especially to the fine nerve endings in the cells of the organ of Corti, to the acoustic nerve itself and of each part of the brain where the impulses carried by this nerve take effect. Otologists are in fair agreement as to these physical and physiological functions of the grosser anatomical structures. The last word, however, has not yet been said as to theories of hearing; that is, concerning the analysis of sound waves by the cochlea and the perception of sound by the receptors in the brain.

These problems are gradually being clarified through two types of study —that of patients in the clinics and by various methods of testing the hearing of animals. In this latter type of study, there are three methods: picking up electrical impulses from various areas in the middle ear; from the acoustic nerve and from the brain; training animals by various methods (experimental psychology) to respond to pure tones or vibrations of definite frequency and loudness; and by watching or measuring muscle reflexes in the middle ear after presenting definite tones.

After one knows, as far as possible, just what a given normal animal can or cannot hear, procedures are employed to affect various parts of the organ of hearing or brain and thus ascertain how they (or perhaps we) hear and under what conditions. Further experiments are carried on continually to learn what part bone conduction by various routes plays in normal and impaired hearing and under what conditions its determination is of diagnostic importance for the patient. Diagnostic tests by various other methods are becoming more and more refined.

The Eustachian Tube

To large numbers of people, many already more or less severely deafened from other causes, the proper opening and closing of the Eustachian tube is of the utmost importance. It may even spell the difference between hearing conversation or not, even with a good hearing aid. This closure is usually due to excessive and abnormal growth of tissue within or at the orifice of the tube. This frequently predisposes to middle ear and mastoid infection. Often a large proportion of the hearing may be restored with the removal of this tissue with radon or Roentgen rays. The latter method is more difficult to apply, more treatments are required, and is not without an element of danger in unskilled hands. These treatments were initiated in the United States a few years ago but intensive study of aviation deafness during the war has improved the methods. It is hoped that those afflicted by this closure may soon receive more adequate and permanent relief than the use alone of the old method referred to by patients as "blowing out the ears."

Investigations (using animals) concerning noise as a cause of deafness in our armed forces, in aviators and especially in industrial workers bid fair greatly to minimize the incidence of deafness in our general population.

Typical Research Studies

Effect of Diet

Experiments on animals to evaluate the effects of diets (including vitamin lack) continue. Certain definite microscopic changes in some parts of the end organ of hearing have been noted after withdrawal of some of the vitamins or other substances from the diets of animals. These findings have not been sufficiently correlated with hearing tests before and after the experiments. Numerous clinical studies in relation particularly to high tone deafness have been made. Favorable reports after feeding vitamins to the deafened, often in addition to other forms of therapy, have been given but it would seem that, while some of the evidence is very suggestive, it is insufficient considering the comparatively few patients studied, often without proper controls, to prove that a specific effect on the nerve of hearing has been produced. The hard of hearing should be on their guard against dietary preparations "to cure deafness." Particularly, they should not take vitamin tablets except upon the recommendation of their physicians. An excess of certain of these may be very harmful.

Effect of Certain Drugs

Another investigation upon animals in which microscopic studies are being correlated with hearing tests concerns the use of certain drugs, especially those harmful to the nerve of hearing. General practitioners are becoming more "deafness-minded" concerning the long continued use of these drugs for various complaints in any given deafened or normally hearing patient, especially when the latter, frequently well past middle age, begins to complain of deafness or "head noises."

A close study is being made of the bacteriology of those organisms having to do particularly with middle ear infections. Newer drugs have been devised which have specific action only against certain bacterial species responsible for some of these infections and not against others causing the same general type of infection. These latter have their own anti-bacterial drugs. Results of this newer knowledge are spectacular as statistics of treatment of middle ear infections show. In one large California city alone the necessity for hospitalization and length of sojourn of children with middle ear infections has diminished about one-half compared with the former rate. Other very favorable data are being published.

Hearing Aids and Testing Human Hearing

On the assumption that this subject will have adequate consideration elsewhere in this handbook, it will be sufficient to mention here that intensive research on a large scale in this field is underway. This is based to a considerable extent on the knowledge gained in three large military hospitals during the war. Since its close, the present over-all investigation has never been in more competent and experienced hands and its results will undoubtedly revolutionize many of our past conceptions and practices concerning these problems.

Unfortunately studies of artificial ear drums and ossicles, mentioned in the first edition of this handbook, have been unavoidably discontinued. It is hoped the discontinuance will be only temporary.

The Window Operation for Patients with Otosclerosis

Probably every deafened adult has now heard of this method which, under reasonably definite conditions, may restore some hearing at least. Detailed procedures and statistical results of several thousand operations are now available for analysis. New methods are constantly being described and tried. Many of these are just as much within the field of research as those performed on monkeys or other animals.

This work on monkeys involves a tedious process, since animals do not have otosclerosis. One worker has investigated in monkeys five groups of procedures for this operation. The animals must first be trained to respond to tones of various frequencies and loudness. After this, anatomical changes must be made in their normal ears to simulate or duplicate as far as possible the condition found in human patients with otosclerosis. Then, after the animal recovers and its hearing has again been tested, the window operation itself is performed. In order to attempt to evaluate the causes of failures or successes, after various periods, the hearing is again tested and finally the animals are dispatched. Microscopic studies of material from the operative field are then made. Hundreds of operations are being performed on human patients based very largely upon the results of studies on animals.

Regarding otosclerosis itself, in spite of many decades of investigative work on animals and man, nothing new, as far as I am aware, has been advanced concerning its cause or possibility of cure. However, this surgical procedure does in many carefully chosen cases ameliorate its effects.

Head noises (tinnitus) which may or may not accompany clinical otosclerosis, and other forms of deafness, may be caused in several ways. Amelioration or cure in many of these unfortunate patients is often very difficult, especially when deafness itself is not involved.

Inheritance of Deafness

The study of the inheritance of deafness, particularly when due to otosclerosis which is much more prevalent, clinically at least, in females than in males, continues to engage the attention of scientists. One fruitful field lies in the accumulation of more data on identical twins, one or both of whom may be otosclerotic, or who may or may not have relatives with otosclerosis. This study becomes of special interest if the twins have been subjected to different environmental conditions. Any reader of this chapter who knows of such deafened identical twins will confer a great favor by informing the Central Bureau of Research of the American Otological Society, 140 Fifty-fourth Street, New York City 27.[1]

The re-education of residual hearing in those severely deafened is beginning to receive, outside of institutions for the deaf, more of the attention it deserves. This work, as far as I know, is being studied principally by individuals whose efforts might well be further supplemented by larger strictly scientific groups. This will come with the organization now under way of "Hearing Centers" modeled after those at our three large military hospitals during the war.

Prevention of Deafness

Undoubtedly the most immediately fertile field for decreasing the incidence of deafness in our population lies within the effort of more frequently testing the hearing of school children.[2] Such group studies by research otologists and other scientists provide most important information in this respect. With greater effort on the part of all of us, every child in the public and private schools of this country could ultimately have his or her hearing tested every six months. More and more parents are beginning to realize the implications of deafness in their young children and now one seldom hears the plea that "they will outgrow it."

Along sociological lines, studies are being made of auditory defects as a factor in mental and social maladjustment of children and adults. Further investigations from a socio-economic standpoint having a bearing on nutritional standards and other factors, more or less within the control of parents and guardians, as possible causes of deafness may ultimately result in reducing the number of emotional "problem children" and our far too numerous deafened juvenile delinquents who are often potential adult criminals.

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[1] Knight Dunlap, "Antidotes for Superstitions Concerning Human Heredity," *Scientific Monthly*, LI (September, 1940), 221-225.

[2] Horace Newhart, "President's Address: Observations on the Conservations of Hearing," *Laryngoscope*, L (September, 1940), 847-850.

Those who desire to assist financially in purely scientific research in otology and allied subjects may send any sum, however small, to the Central Bureau of Research above mentioned. Funds are allocated annually to those universities or other institutions in the United States and Canada which are especially equipped with excellent laboratories under highly trained scientists of national reputation in this field.

More and more the journals of such lay organizations as The American Hearing Society and the Volta Bureau (for the deaf), both at Washington, D. C., are devoting their energy toward the promotion of surveys on various phases of deafness and in the publication of the results of their own activities and of some others of a scientific character. They both deserve the wide co-operation of the normally hearing though deafness-minded public.

THE PSYCHOLOGY OF THE HARD OF HEARING

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Every now and then each one of us pauses to wonder about something that has happened to us and why it has happened. It may be a pleasant event or it may be unpleasant. If we take time to try to discover why it happened, we may be able to find a reason, or we may not. As a matter of fact, a good many things happen that no one can explain in any very satisfactory manner. We might refer to them as "accidents of life."

What can we do about them? If the accident of life is a favorable one, we can try to make the most of it, to get as much good as we can from it. The real test is what to do with the unfavorable accident that upsets our plans and threatens to cause hardship or unhappiness to ourselves and our families.

One of the most grievous accidents of life that can come to anyone is the loss of hearing. If you have experienced a hearing loss, have consulted an ear specialist, and there is nothing he can do to restore your hearing, then this impairment is something you have to live with. You are the one to decide whether or not it will cause the unhappiness to you and your family that it threatens.

You can be rebellious and resentful and let it spoil your life. You can rage against this accident of life and butt your head against a stone wall. Or you can learn to live with it comfortably in an intelligent, realistic way that will give your friends an example of valiant living and courage to tackle and solve one's problems. That doesn't mean taking a forced Pollyanna attitude, but it does mean accepting your handicap and preventing it from having an unnecessarily detrimental effect on you.

How can this be done? By applying common sense and psychology to each part of one's thinking, feeling and behavior. A review of some of the techniques that a psychologist teaches his clients will be of practical help. You can apply these techniques yourself. If you find that you are not succeeding, and the problem persists, then the help of a professional psychologist who has had experience with these problems should be sought.

CHANGE THE MEANING OF THE SITUATION

One of the things that a psychologist does for his client is to help him change the meaning of a situation that is distressing him. A given situation may have one meaning for one person and an entirely different meaning for another person. For example, take the situation of a man entering an empty apartment at night in the dark. To one man this may mean coming

home to a quiet, restful atmosphere where he can relax, be comfortable and feel secure. To another it may mean loneliness, fear, and boredom. Yet the situation in one sense is the same. If the second man can change its meaning to correspond with the meaning it has for the first man, or in other words, change his attitude, he will find enjoyment in the situation instead of distress.

In a similar way, a hearing impairment may mean to one person a hardship to be resented and resisted so bitterly that the struggle and resentment are worse than the limitations of the impairment itself. To another it may mean a handicap to be accepted and one that he takes great pride in overcoming as completely as possible. Thus, one meaning attached to "hard-of-hearing" leads to cheerfulness and a feeling of personal worth from having achieved the difficult task of overcoming it. This matter of meaning is very important because the meaning you give to this accident of life will determine how you meet the handicap. *Behavior follows the idea in the mind.*

Analyze the Problem

Learning to analyze your problems in order to determine the alternative courses of action open to you is one of the most important techniques psychology can teach. In most situations you have a choice as to what action you will take, and thinking the situation through aids you to make the wiser choice. As a hard-of-hearing person, however, you do *not* have a choice as to what you would do if you were not hard of hearing, since this is not a real alternative. But you *do* have these alternatives: Which attitude shall I take toward my disability? Shall I be bitter and unhappy and make no effort to overcome it? Or shall I take an optimistic, constructive point of view and use all my intelligence and ingenuity to live a full, normal life? Shall I try out every device, physical and psychological, that hard-of-hearing people have found useful, and incorporate it into my way of living, if suitable, or shall I do nothing and constantly bemoan my fate? Shall I overcome my handicap, or be overcome by it?

Most of life's problems, when analyzed, present alternative courses of action. By thinking the problem through we clarify in our own minds what we can do and what we cannot do; of two or more things we might do in a given situation, we can select the one that will bring the most benefit or the most enjoyment. Obviously we do not give up good things for those of lesser value. You cannot be sure at first that trying to overcome your handicap will be worth-while, but the experience of people who are leading full, normal lives though hard of hearing is worth thinking about. You can try it out. If you find that this gives you more satisfaction than holding on to your resentment, or going back into your shell, no one can stop your progress, for we go on to what seems to us better things if we know what they are.

In this article as well as in the books and articles listed in the bibliography at the end of this booklet, you will find many problems that are encountered by hard-of-hearing people. Study those problems and see how they have been solved. By reviewing the many and varied adjustments that others have found effective you can often adapt their solutions to your own situation in so far as your problems are similar. Also you will learn to apply the same principles to any new problems that may arise.

Incidentally, has it occurred to you that being hard of hearing is but one of many kinds of handicaps that people suffer from and to which they must adjust? *Often we are amazed when we learn what a burden the other person has been carrying.*

Develop a Problem-Solving Attitude

Some psychologists judge the progress of their clients by the extent to which they develop a problem-solving attitude. This involves, first, the elimination or control of any strongly emotional disturbance you may feel toward the situation. Strong emotions like anger, resentment, self-pity and blame may so upset you as to interfere with clear thinking.

The next step in developing a problem-solving attitude is to be as objective as possible in your thinking; that is, to consider the problem impersonally in order to understand all the facts and factors involved in the situation. Then, understanding just what the problem is, you can determine the various courses of action open to you and select the one which will bring about the best solution.

The third step is to train yourself to take appropriate action toward actually solving the problem. That is, when you have considered the situation calmly and thoughtfully, and have selected the best course of action, you proceed to do whatever is necessary to bring about the solution.

Change the Situation or Adjust to It

What constitutes a good adjustment to life? Epictetus laid down a good rule centuries ago when he said: "Concern thyself with what is within thy power." This applies to your loss of hearing which involves a situation that cannot be changed. Your grief will not restore it. Constructive thinking, however, will tell you that you can do something about it. First, you can accept the reality that you are hard-of-hearing and then put it out of your mind. The old wound should be cleansed, cauterized, and left to time to heal. Accepting the inevitable as comfortably as possible is an adjustment in attitude. Next, you can act sensibly by procuring a hearing aid and learning to use it effectively, by learning lip reading, by selecting a vocation that does not require acute hearing, by having a happy social life, and the like.

Some situations can be changed, and the clever person who finds an effective way to change them takes mastery over them. Sometimes in a seemingly unalterable situation some factor changes so that the situation that yesterday seemed to demand an adjustment to meet, can today itself be changed. In such an event, one must act quickly and surely to change it.

In considering any problem, then, first ask yourself whether or not the troublesome situation can be changed. If it can be changed, act to change it, choosing the most favorable course of action. If it cannot be changed, accept the fact philosophically and adjust to it as comfortably and aptly as possible. By following these principles you can learn to be happy though hard-of-hearing.

> "Grant me the serenity to accept the things I cannot change, the courage to change the things I can change, and the wisdom to know the difference between the two."

An Orientation Check List for the Hard of Hearing

Every day a new group of people find that hearing is becoming difficult. World War II thrust hundreds of young men into this group of deafened people. The serviceman has an advantage in that the government has tried to do everything it can to help the rehabilitation process. Finally, however, he has become one of the thirteen or fourteen million people in this country who are deafened, and it is up to him. Now he is a civilian and faces the same adjustment as other civilians. He is a hard-of-hearing person first and a veteran afterward, and what applies to other deafened people also applies to him.

The experiences of other hard-of-hearing people in handling specific difficulties may give you ideas of what you can do. This section lists twenty-four areas in which deafened people have the same problems that other people have, but with much increased necessity for finding the answers, and with a number of special problems. Here are some practical things that can be done.

Use this section as a check-list to work over these aspects of your life systematically. If you are handling each of these twenty-four aspects well, then you are getting along and can help other people with their problems.

1. Sometimes a difficulty burns and sears, and warps your outlook if it is kept bottled up or denied. It may make you unhappy until it is brought out into the open and put into words, until you can say calmly: "Yes, I am hard-of-hearing." When you can say right out loud, "this is what is bothering me, this is what I am trying to forget," it will lose much of its force to hurt you.

It is here that a psychologist who knows the problems of the hard of hearing is often of great help. You can lay bare your soul to him, and then work with him on finding solutions. Or talk to some understanding person such as the secretary or social worker of your Society for the Hard of Hearing, or some man or woman with impaired hearing who has made a good adjustment and can help others. He can listen to your story, tell you of his experiences overcoming this handicap, and help you see how you can adjust. If you do not know such a person, ask the secretary of your society, or an otologist, for the name of someone. He will be glad to help you.

2. Are you trying to fool others about your loss of hearing? Are you trying to hide it, hoping that your day-to-day associates will not suspect it? Do you think you are getting away with it? You can't hide it. People will find it out anyway. The fact that you are hard-of-hearing must be faced squarely and honestly; it must be admitted in a matter-of-fact manner to yourself and to your friends, to the whole world, in fact. If it is admitted freely, then you can take steps to compensate for it; otherwise you cannot.

Don't try to bluff and give answers as if you understood everything that is going on, if you don't. A prominent physician expressed the feeling of most people when he said: "I do not mind repeating or being careful in talking, but I am irritated when I am uncertain as to whether or not a hard-of-hearing person knows what I have said."

3. Do you have the best hearing aid you can possibly get? You wouldn't expect to get along without glasses if your eyes bothered you, or to see well if you neglected to have the glasses changed as frequently as needed. But merely buying a hearing aid is not enough; you must learn how to use it efficiently. This is called auricular training. Sometimes this is not easy and you will have to try very hard. If you do not get the hang of it, ask your Society for some help. Otherwise you may waste the money you have spent. If you live where there is no Society, write to the nearest one and see if you cannot make arrangements to go there for some special help. If you are an ex-serviceman, you already have a good beginning.

4. Are you a skillful lip reader? Some hard-of-hearing persons have great difficulty in learning to read the lips, and so may you, but keep trying. It is worth the efforts you may make if you can master this art. Do you try to get good lighting, and proper glasses for your eyes, if you need them, so that you can see the lips of the speaker as clearly as possible?

5. You can frequently let your eyes hear for you, that is, you must often see what others hear. Find a substitute way of getting information if your ears do not serve you well. Maybe you cannot hear the doorbell, and so you are afraid to invite friends. This may make you feel sorry for yourself. But you can, instead, have installed a large lamp in every room which will

flash on and compel you to notice that the bell is ringing. If your electrician does not know how to do this, get information from the American Hearing Society. You can also have a light which will flash on when your telephone rings. This can be put on a long cord so that you can take it with you from room to room. If you do not hear well on the telephone, an amplifier will often make conversation pleasant and understandable.

Royal Brown, writing in the *Cosmopolitan Magazine*[1] tells of the marvelous way in which he has learned to use his eyes to see more than others see, and thus compensate in large part for his loss of hearing. Go to your public library and read this article. It will more than repay you. Mr. Brown believes that until we train ourselves really to see, we miss much that we might learn. Perhaps you cannot hear a general conversation, but you can watch the people talking and learn a good deal of what is going on, without hearing a word. You can make friends by noticing when someone is bothered by a draft or a light shining too brightly, or when a person needs a match. Mr. Brown writes: "To be interesting you must be interested. To be interested, your vision must be turned outward, not inward. You must see fully what is going on about you." Such enrichment of life is possible for everyone.

6. Are you realistic about the high cost of a hearing impairment? If you are, you will not fret because you have to spend money on hearing aids. Many hard-of-hearing people do not have the money to spend on these aids and have to use all their ingenuity to make up for it. Be glad you have the money to spend.

7. Are you trying to use what hearing you have left? Or are you making no effort at all to hear and depending entirely on lip reading? You should be using what hearing you have left. The chapter "New Hearing for Old" in *How to Help Your Hearing*[2] gives a fascinating account of the author's development of her so-called residual hearing. From it you can discover ways and means to help yourself in this regard.

8. Are you trying to keep your voice pleasant? Read the material on that subject in this publication.

9. Do you watch your health to see that it is as good as it can possibly be? Minerals and vitamins, plenty of rest so that the body is not chronically fatigued, and good medical attention will help to bring that physical well-being which makes optimism and courage easier. The effect of health on one's state of mind is well known. Read Dr. Fletcher's chapter in this publication.

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[1] Royal Brown, "Sit Up and Take Notice," *Cosmopolitan Magazine*, January 1941, p. 57.
[2] Louise M. Neuschutz, *How to Help Your Hearing*. New York: Harper & Bros., 1940.

10. Any hearing loss means that the strain of listening makes a drain upon the nerves. If any degree of happiness is to be achieved, you must give up the effort of trying to do what no longer lies within your power. If you cannot hear a play, do not go to plays. Are you organizing your life around an unstrained effort to conserve your hearing? Decide what you can do, and what you cannot do (be honest about this), and stick to it. Do not try to do the impossible. Enjoy what is still yours, and let the rest go.

11. Trying to hear is fatiguing. Therefore you must have time alone to recuperate from the fatigue of the effort. Such recuperation is really necessary for everyone, but doubly so for the hard of hearing. You learn to compensate for the extra fatigue by getting extra rest. You must plan to rest. A nap after lunch or in the afternoon can often be managed in addition to good sleep at night.

12. There are thirteen or fourteen million hard-of-hearing people in the United States. You do not need to feel isolated and alone. You belong to this large group of human beings and with them you can have a feeling of comradeship.

13. Are you co-operating with your local Hearing Society? You will get many suggestions from them. Probably your whole social life should not be limited to that group. If possible, you will want some social contacts with people who have unimpaired hearing. But the Society will give you many things you cannot get elsewhere—help with the problems that specifically belong to the hard of hearing. You will find interesting social events, lip reading classes, help with your hearing aid. In most societies there are special groups for young people, which include servicemen and servicewomen. *The Volta Review* until recently had a department each month devoted to servicemen, "The Service Club," giving many amusing and serious experiences of servicemen. Some of these are listed in the bibliography and are worth your reading. The June 1945 issue describes the Veterans Sounding Post, New York Chapter, which offers many services to deafened veterans.

You will probably enjoy and get considerable encouragement from reading some of the excellent articles in the magazines published for the hard of hearing, such as *Hearing News, The Volta Review,* and *Federation News.* The stories of people, usually written by themselves, who are living rich and zestful lives in spite of the inescapable hazards of loss of hearing cannot help giving one courage to find a good way of life for oneself.

Some of these articles are listed in the bibliography at the end of this booklet under the section "Psychology of the Hard of Hearing." Those without hearing impairment may also be spurred on to solve their own problems by reading these articles. You may do your friends a service by recommending

them, for all problems have one thing in common—it takes courage to solve them.

Can't you see that at least *The Volta Review* and a few books are in your public library so that others groping their way may find some help? Are you active in your community in trying to help others who have an impairment like you? If you live where there is no chapter of the American Hearing Society, have you thought of forming a little organization of these people? Make them see the fine opportunities there are to help others, to recognize the handicaps of hard-of-hearing children, and give them a better chance than children of former times. If no one else does it, take the responsibility of selling the idea to your schools and other civic organizations that all school children in your community should have their hearing tested. Show them that much of the hearing impairment of children can be prevented if discovered early enough. Don't forget the school children. To know you are useful may transform your whole life. It has had that effect on others.

14. Do you feel sorry for yourself and spend more time in self-pity than in getting out and helping others? If you are very busy doing things for others you will not have time to grieve. When trying to help others find the way we ourselves see the way more clearly.

Dr. William C. Menninger,[3] writing as chief of Neuropsychiatric Consultants, Surgeon General's Office of the Army, urged veterans to take active leadership in youth and community projects. In doing something worthwhile for your community you will be surprised how much you are doing for yourself.

15. Are you doing your work as well as you can? A feeling of personal worth is essential to everyone. This is achieved, not by wishing for it, but by working for it. This feeling of personal worth has two sides. One side is other people's good opinion of you. The other is your own feeling of satisfaction because you have achieved something. Therefore, you should do your work not only so that you feel all right about it, but to suit your employer as well.

Is your work routine and dull? Unfortunately, much of the work of the world is. Don't fret about it, but do it well, because careless work would damage your feeling of personal worth. But live after five o'clock; do all the things you like to do then. If you are a housewife, perhaps you can take special pride in certain parts of your work, and get satisfaction in doing well what formerly you did only indifferently. For example, you may achieve a real reputation for being a good cook or seamstress, or managing your work efficiently.

[3] William C. Menninger, "The Mentally or Emotionally Handicapped Veteran," *Annals of the American Academy of Political and Social Science*, CCXXXIX, (May, 1945), 20-29.

16. One good way to get your thoughts away from your handicap and from routine work is to develop hobbies. Do not go to the extreme of choosing a hobby which takes you entirely away from people, or one which requires so difficult a hearing adjustment that the purpose of the hobby is defeated in the strain it causes. The common sense way is to choose activities which will keep you in touch with people, but not put too much strain on your hearing. Sports, such as hiking, swimming, golf and fishing are ideal. Games such as chess, checkers, cards, billiards, pool and bowling are possibilities.

Reading, music, gardening, both indoors and out, photography, arts and crafts, cooking, writing and a host of others will bring genuine satisfaction and a feeling of accomplishment. Other suggestions will be found in the bibliography. Keep on the lookout for interesting hobbies. One hard-of-hearing person, Catherine A. Hood, has written articles about her hobbies in *The Volta Review*, June, 1938, April, 1939, February and December 1940, and May, June and August, 1942.

17. How sensibly do you arrange your social life? Do you accept every invitation that comes your way (whether or not you will be miserable), or do you go to the other extreme, refuse all invitations and withdraw into yourself? Obviously neither course is common sense. Accept only the invitations you can manage with a reasonable degree of comfort. But don't be too easy on yourself. You can make an effort to do some of the things you would have enjoyed if you had not had a hearing loss. Efficient use of your hearing aid may make this possible.

Small groups are often the easiest. One adroit hard-of-hearing woman, Miss Agnes Stowell, suggests solving this problem by talking to only one individual at a time. At a gathering she picks out one person who seems interested and says: "May I take a hard-of-hearing person's privilege and take you off into a corner for a little talk?"

If drama on the stage is no longer possible to you, learn to see the drama all around you, as Mr. Brown suggests in his article.[4]

18. How well do you apply the psychology you know to your relations with other people? How smart are you in educating your friends so that they will make it as easy as possible for you to hear? Teach your friends to speak in a natural manner, with no exaggerations but distinctly. Also tell them to turn toward you so that you can always see their lips. Train them not to drop their voices at intervals so that you lose the thread of the sentence. Be sure to turn your good ear toward the speaker. Be pleasant about all of this, and don't frown when you have to say: "I didn't hear you." Realize that it is not easy for your friends either.

[4] Royal Brown, "Sit Up and Take Notice," *Cosmopolitan Magazine*, January, 1941.

You might ask your friends to read this booklet or others that cover the points you want to make. Don't bore them or insist, but you might underline specific brief sections and then let them interest themselves. There is something in the authority of the printed page that is often more convincing than the spoken word. An excellent article is "How to Help the Hard of Hearing," by Harriet Montague.[5]

Avoid drawing into your shell. Cultivate an outgoing feeling. Remember the old adage: If you want to make a friend, be one. If you like other people, they will like you. Be warm and cordial and it will draw people to you.

19. Is it a matter of pride with you to get along with the least possible friction with sales people, ticket agents and others whom you meet in your daily life? Think up ways of doing this. *How to Help Your Hearing*[6] has many excellent and specific suggestions.

20. Some people must guard against becoming suspicious of other people whom they see talking but cannot hear. It is easy to think they are talking about you, but probably they are not. Check yourself in this; unless you have positive proof that they are talking about you, pass up the incident. There are so many topics in the world for them to discuss besides you and your difficulties in hearing.

21. Do you have a sense of humor, or are you dead serious all the time? Try developing the light touch. Don't be disturbed if there are times you cannot hear as well as usual. There is no use trying to hold your own in an agitated controversy; you cannot do it. But you can watch, use your eyes and learn a great deal from the expressions and gestures even if you can't read their lips quickly enough. If it is something you need to know, someone will tell you about it afterwards.

22. Learn to be tolerant of the carelessness and lack of understanding of the world in general toward your handicap. One hard-of-hearing person has pointed out that the hard of hearing need to learn to take rebuffs in their stride, but it is also necessary to be wary of earning them. Being socially receptive rather than aggressive is a good rule.[7]

23. Do you have a feeling of blame? Who or what is there to blame? This handicap is an impersonal accident of life.

24. If you are to be happy, you will have to follow the same psychological rules that everyone else has to follow. Each person must make his own adjustments. Others can help you, but you must do the final work. Being

[5] Harriet Montague, "How to Help the Hard of Hearing," *Volta Review*, XLVI, No. 6 (June, 1944), 345.

[6] Louise N. Neuschutz, *How to Help Your Hearing*. New York: Harper & Brothers, 1940.

[7] Florence S. Berryman, "Social Techniques for the Submerged Tenth," *Volta Review*, XLVI, No. 6 (June, 1941), 345.

hard of hearing should not be blamed because you do not want to make the effort of doing a good job of adjustment.

Persis Vose in her delightful little book *Say It Again* tells how she changed from a person who used her hearing impairment as an excuse for all kinds of unadjusted behavior to a well-adjusted person who had a good time in life.[8] In telling of her first visit to a society for the hard of hearing, she says: "I remarked in my sorry-for-myself manner that so many hard-of-hearing people are queer. The secretary said: "Yes, a lot of queer people do visit the League, but I always say of them that they would be queer anyway, and I call them 'deaf all over'." Whenever Miss Vose tried to use her deafness as an alibi, her family called her "Miss Deaf-All-Over."

Life can be zestful, rich and satisfying for the deafened as for the hearing, and the recipe is the same in either case. You, a hard-of-hearing person, can be a comfortable person to be around. As you solve your problems, you will give courage to others who also have problems, though they may be of a different kind.

[8] Persis Vose, *Say It Again*: A Book of Essays. Portland, Maine: Southworth Press, 1931.

WORK, AIMS AND PURPOSES OF ORGANIZATIONS FOR THE HARD OF HEARING

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Problems of the Hard of Hearing

A hearing loss itself need not prevent an individual from developing his remaining capacities. On the contrary he may often surpass the person with normal hearing by means of concentration which should be particularly easy for him, by conscientious thoroughness, and continuous effort to take better advantage of his other senses and faculties. Many outstanding and great people of whom humanity is proud have been hard of hearing. Three of these most often mentioned are Edison, Beethoven, and Washington.

The road to this adjustment and success, however, is admittedly strewn with many obstacles and difficulties which must be overcome. The drabness and monotony of life deprived of sounds of nature, and the human voice, if unrelieved, may allow an individual to drift into an aimless, sleepy existence, an escape from real life to living in air castles. At the other extreme, increasing resentment, if not checked by a saner attitude may develop into aggressive rebellion, "the world owes me a living" attitude, constant conflicts, frictions, and suspicion which makes living unpleasant and difficult.

The person who is losing hearing should not allow himself to be engulfed in the fog of frustration and apathy; he must develop a new attitude. In order that he may get a new lens through which he will see again the beauty and the joy of life, it is necessary for him to remove the panicky fear of tomorrow, to invigorate his body with proper food with plenty of vitamins, sunshine, and fresh air and thereby derive a happy physical and emotional life. To regain his self-confidence and self-respect, which are the mainstays of normalcy and happiness, he must find a purpose in life, an occupation for his hands and mind so that he may feel useful, full of the sense of belonging to the life about him.

Aims and Purposes of the Society

Realizing that effective adjustment depends greatly upon their own efforts, the hard of hearing have organized themselves into a national organization, The American Hearing Society,[1] with local chapters throughout the United States. The members of this organization have the following purposes:

1. To overcome their own handicap, to repair the ravages of personality to which it may have lead; to conserve, develop, and compensate for their hearing and speech handicaps, to develop all their faculties and abilities for participation in active life.
2. To use intelligently the advice and guidance of competent advisers: otologists, social workers, psychologists, teachers of lip reading, vocational advisers and others interested in their problems.
3. To find friends; learn how to co-operate and develop sympathetic understanding and interest in community life.
4. To join in common effort through the American Hearing Society toward prevention of deafness, and the conservation of hearing of children and adults; to enlighten public opinion as to the significance of the problems; to secure state and national legislation to aid in this work; to co-operate with specialized social agencies and to develop social service clinics for the hard of hearing; to alleviate or prevent the psychological effects of deafness.

Agencies at Work on Problems of the Hard of Hearing

California now has over thirty chapters or prospective chapters of the American Hearing Society with about 2100 members. The largest of these groups is in San Francisco, the smallest in El Centro.

The Pacific Zone of the American Society unites the work of the California, Nevada, Arizona, and Hawaiian organizations. In southern California, where each community has a separate organization, some twenty of these are affiliated in a Co-ordinating Council for the Hard of Hearing.

Local Chapters

We consider our local chapters to be of the nature of service clubs. According to one authority such clubs are characterized as follows: First, brings together kindred spirits who fraternize in an atmosphere of geniality and camaraderie. Second, a spirit of friendship and good will pervades; and third, a service club has an objective—doing something useful and helpful for some

[1] Formerly American Society for the Hard of Hearing.

worthy cause. The societies for the hard of hearing meet all of these conditions. If men and women with normal hearing find it advantageous to join together in a service group, it is even more necessary for the hard of hearing to find a similar outlet in an organization peculiarly fitted to their needs.

That the isolation of the hard of hearing is largely responsible for traits often attributed to them—sensitiveness, suspiciousness, lack of courage and initiative—can no longer be questioned. If isolation develops these traits, then surely the cure lies in the removal of the cause. Entertainments, card parties, teas, out-of-door trips, and gatherings for various activities provide incentive for the hard of hearing to get together and cast aside isolation. A typical California society, in addition to two regular meetings a month and the lip-reading and voice classes sponsored by the public schools, also has a sewing circle, a card club, and a dancing club. Another has organized a bowling circle; another, a class in parliamentary law; another, a class in Our America, and another, an Art and Travel Study club.

Men are encouraged to initiate activities in which they are particularly interested. Hard-of-hearing young persons, our Young People's Group (Y. P. G.), are now attached to a number of local societies. The activities we provide, others who are not hard of hearing may enjoy thoughtlessly, but special facilities including hearing equipment is often necessary to make them easily available to the hard of hearing. Thus, the hard of hearing are enabled to enjoy a more normal life, and the result is a better adjusted man or woman. An atmosphere in which one is not at a serious disadvantage and which brings him friends, is a great boon to the hard of hearing. What others find in the woman's club, the Lions Club, the Rotary Club, the Optimists, the hard of hearing find in their own societies.

The Hearing Society at work within itself develops latent ability in its members, offers opportunity for growth in personality, and creates normal outlook with the right perspective on impaired hearing. Someone has well said that the Society is a "hope filling station." It is here the bewildered and rebellious hard of hearing find sympathy and understanding, and through it they readjust their lives and themselves—become rehabilitated. The larger the numbers of people the Society for the Hard of Hearing can put to work within itself, the greater will be its claim to being a service organization, for out of this experience and training in making the wheels go round within the Society come the leaders who will promote the objectives. When the Society dies from within, then it, too, fails to function outside. If you are hard of hearing and do not belong to a Society for the Hard of Hearing, you are in truth missing something!

CHAPTERS OF THE AMERICAN SOCIETY FOR THE HARD-OF-HEARING IN THE STATE OF CALIFORNIA

1. San Francisco	1916	16. Orange County	1932
2. Los Angeles	1916	17. Covina	1934
3. Santa Barbara	1921	18. Santa Cruz	1935
4. Long Beach	1922	19. Inglewood	1935
5. San Diego	1924	20. Compton	1936
6. Santa Monica	1925	21. Stockton	1936
7. Pomona	1926	22. Beverly Breakfast Club of Southern California	1936
8. Fresno	1928	23. Bakersfield	1937
9. Glendale	1928	24. Riverside	1937
10. Pasadena	1929	25. San Bernardino	1937
11. Sacramento	1929	26. Three Beach (Redondo, Manhattan, Hermosa)	1937
12. East Bay (Oakland, etc.)	1929	27. Watsonville	1937
13. Beverly Hills	1930		
14. San Jose	1931		
15. El Centro	1932		

PROSPECTIVE CHAPTERS

1. Palo Alto
2. Southeast Society (Maywood, Bell, and others)
3. Whittier
4. Oceanside

Adult Education

Because of the great advances made in adult education in California, it has been possible to secure free classes for hard-of-hearing adults in many of our public schools. Local boards of education give information regarding the schedules for classes in which speech reading, speech improvement, and related subjects are taught. In some cities, group hearing-aids are provided in classes, sometimes by arrangement with the local organization for hard-of-hearing people.

The University of California in Los Angeles and Berkeley has offered training courses for teachers of the hard of hearing. The University of Southern California now offers such courses throughout the year and actively sponsors conferences and workshops for study of the problems of the hard of hearing, and the training of social workers for work among the hard of hearing.

Public Assemblies

Twenty societies in California own group hearing-aids, having from ten to eighty head-phones, and fifteen of them lend this equipment for use outside the local chapter headquarters in community activities: forums, dinners, lectures, and special church services.

In co-operating with the hearing-aid companies, the chapters have been successful in securing the installation of hearing aids in churches. At this date, twenty-one. California cities report one hundred eleven churches equipped with hearing aids and more are being installed rapidly. Twenty-one cities report aids in seventy-three motion picture theaters. Besides these, six legitimate theaters in two cities, a few funeral parlors, four Masonic lodges in one city, two civic auditoriums and the Pasadena Shakespeare Club have group-aids. Urging further installations is one of the most important duties of each chapter.

Social Service

Each local society provides for some consultation regarding hearing aids. Several chapters like Inglewood, Redondo Beach, Hermosa Beach (Three Beach Society), Bakersfield and others have volunteer hearing clinics where the testing of children and adults is done on certain days in co-operation with the schools, PTA's, service clubs and otologists. Comparatively little social service work for the hard of hearing has been done in the homes by the social worker.

Social service work is probably best developed at present in San Francisco. Our goal is the establishment of centers where all around service may be rendered to the hard of hearing with the co-operation of otologists, social workers, technicians, vocational counselors, speech reading and speech correction teachers, and teachers of auricular training, as is being done in England.

California Better Hearing Council

Meets bi-monthly (first Sunday of the month) in San Francisco-Oakland Bay Area. Established 1943 as an unincorporated, non-profit organization with membership open to all persons interested in solving problems of hard of hearing people and in educating the general public on this subject. Doctors, nurses, educators in general, teachers of voice, speech, lip reading, etc., as well as the hard-of-hearing people themselves, are members of this organization.

Co-ordinating Council of Societies For the Hard of Hearing

Eighteen chapters of the American Hearing Society which make up the Southern California Breakfast Club are banded together into a Co-ordinating Council of Societies for the Hard of Hearing. This Co-ordinating Council is an agency of the Welfare Council of Metropolitan Los Angeles and issues a paper called "The Bulletin."

The aims and objectives of this Co-ordinating Council are: to serve the affiliated chapters; to promote social service work; to co-operate with the Hearing Center of Los Angeles; to serve veterans; to give hearing aid information; to promote the conservation of children's hearing in the schools; to assist in employment of the hard of hearing; to encourage establishment of classes in speech reading and to encourage research and teacher training in speech reading.

Hearing Center of Metropolitan Los Angeles

The Hearing Center of Metropolitan Los Angeles was recently organized through a special board set up by the Committee on the Hard of Hearing of the Welfare Council of Metropolitan Los Angeles. The primary purpose of the Hearing Center is to co-operate with the existing agencies, both public and voluntary in greater Los Angeles and to develop to the fullest extent an adequate program of conservation of hearing.

The Center is interested in an over-all and inclusive program of rehabilitation for people of all ages who have hearing impairments, to make the public aware of the existing facilities now available for such a program, and to develop facilities where needs are not met.

The Center is co-operating with existing agencies in the prevention of deafness; finding the child with a hearing defect, attempting to provide adequate medical care for the child who is in need of such service, establishing an adequate remedial educational program for children who cannot be helped medically, encouraging the use of hearing aids on the recommendation of an ear specialist; promoting vocational guidance and training, social adjustment and suitable employment.

The office of the Center is located in the Chester Williams Building, Los Angeles. Lowell C. Ruch, Executive Director.

Community Publicity

During National Hearing Week, formerly the last full week in October, now second full week in November, the local chapters bring their work and that of the American Hearing Society to the attention of the general public by radio talks, lectures, pamphlet material, posters, demonstrations of speech reading, sale of stickers, and publicity meetings of various kinds.

Twenty Societies have printed or mimeographed bulletins for members and for anyone wishing to subscribe. These are to be found in the waiting rooms of otologists and hearing-aid companies, and eventually, we hope, will be found in every library, Chamber of Commerce, doctor's office, travel bureau, and railway station—in short, in every place of public information.

Employment Services

San Francisco has its own committee on vocational rehabilitation under the chairmanship of its own social worker. Sacramento has an employment bureau; Long Beach, an active committee; East Bay Society (Oakland, etc.) and Orange County provide vocational counseling.

Legal Provisions for the Hard-of-Hearing Child

One of the great objectives of the Society is to promote the interests of the hard-of-hearing child. It is of utmost importance to know which children are hard of hearing, so that special facilities may be provided for them. Even those with as much as 25 to 30 percent loss of hearing have, in the past, been considered recalcitrant or mentally dull, instead of suffering from a loss; yet careful surveys by means of audiometers in widely separated communities have revealed but 7 to 8 percent of the school population have measurable hearing losses and 1 to 3 percent require special educational facilities and remedial treatment.

In some states such surveys are mandatory and are carried out by the Department of Public Health or by the Department of Education. In California there is a "permissible" statute covering this activity. The surveys may be made by the local school districts. Some school districts have purchased audiometers for this purpose, others co-operate with the public health authorities, and in some localities voluntary organizations have made surveys.

As a crowning achievement the chapters were instrumental in securing legislation which led to the setting up of specialists in conservation of hearing in the State Departments of Health and Education in California. These state officials are now in position to promote and develop the work that has long been recognized as a primary essential by the organizations for the hard of hearing. However we do not intend to rest at this point. Instead we are even now engaged in developing other equally essential benefits which when they are realized will aid the hard of hearing in their adjustments and even more aid in the prevention and elimination of deafness.

Part II

HEARING CONSERVATION AND THE HARD-OF-HEARING CHILD IN CALIFORNIA

INTRODUCTION

With realization of the need for a co-ordinated health and educational program which would facilitate the case-finding, diagnosis, medical treatment, and program of special education for hard-of-hearing children in California, legislation was passed which provided for a division of responsibilities on a state level between the State Department of Public Health and the State Department of Education. Two consultant positions were created, one for each department: the Hearing Conservation Specialist and the Consultant in Education of the Hard of Hearing.

An Advisory Committee on Hearing Conservation was appointed by the chairman of the Ear, Nose and Throat Section of the California Medical Association to assist the department of health with its phase of the program. Under the Crippled Children Program of California, all physically handicapped children are sought out by a well co-ordinated program directed through the State Department of Public Health, and diagnostic facilities are made available to all children.

Prevention of handicapping conditions is the primary function of the hearing conservation program. This can be accomplished ONLY through early detection, accurate diagnosis, and immediate medical care with conscientious follow-up.

Case-finding through audiometric testing is done by trained technicians, either Public Health and school nurses, or trained, experienced lay personnel. Only specially qualified otologists are selected to examine those children who have been found to have losses of hearing. Especial attention is given those children with high frequency losses. Through Crippled Children Services, children whose parents are unable to procure care under a specialist or who are unable to purchase hearing aids, are provided with these services. Funds for the care of all handicapped children are available through county appropriations and set aside for this purpose.

Joint planning of the state-wide Hearing Conservation Program between the State Department of Public Health and the State Departmentof Education has resulted in a unique situation whereby all facilities are utilized for a united purpose: to find the hard-of-hearing child, care for him medically, and provide adequate special education when necessary. This same principle of joint planning is being adopted by most of the fifty-eight counties in California. It is to be remembered, however, that this is a long-term program.

Its development in the counties will vary according to the differences in administration of health departments, school districts, and Crippled Children Services. Perfection in such a plan calls for the co-operation of all agencies and professions in addition to an extensive educational program and community enterprise.

WILTON L. HALVERSON, M.D.
Director State Department of Public Health

AUDIOMETRY IN CALIFORNIA

DONALD R. CAZIARC, *Hearing Conservation Specialist, California State Department of Public Health*

In the fields of acoustic physics and otology, *audiometry* has become an integral part. Defined, audiometry is the art of determining the power or limitations of hearing, i.e., recording the audibility of sounds or words.[1] Two types of audiometer testing have been utilized in seeking out children with defective hearing in the public and parochial schools of California. These have been accomplished through, first, group testing with the speech (phonograph type) audiometer and, second, with the individual pure-tone or discrete frequency audiometer.

With the realization that many children, handicapped by hearing impairments, were struggling along without medical or educational assistance, a concerted drive is being made to rectify this situation. Fostered by such organizations as the American Hearing Society (formerly the American Society for the Hard of Hearing), The Ear, Nose and Throat Section of the California Medical Association, local and state-wide groups who sought to obtain recognition of the hard-of-hearing child, and collaborating departments of health and education, embryo programs of hearing conservation were introduced throughout California. Many progressive school systems purchased phonograph type audiometers, delegated the responsibility of hearing testing to nurses or teachers, and even employed trained teachers of lip reading and speech correctionists to provide special education for this handicapped group. These initial steps did much to create an awareness of defective hearing in the school systems. However, very little training was given persons responsible for testing and little was done for the children after they were referred to their parents with a cursory note stating, "Your child has been given a hearing test which reveals an appreciable loss of hearing. It is recommended that you have the child's hearing examined by your family physician. . . ." Few parents heeded this all important recommendation.

Today, however, two measures have been undertaken which should ultimately assure the hard-of-hearing child adequate care, both medical and educational. In order to standardize methods of testing and establish criteria for referral of acoustically handicapped children for otological examinations, the State Department of Public Health was delegated the responsibility for

[1] V. O. Knudsen, *Audiometry*, Sonotone Laboratory, New York, 1937.

case-finding,[2] establishing qualifications for and registering School Audiometrists, and providing otological diagnosis for the hard-of-hearing child.

Persons rendering health services to school children must hold a Health and Development Credential, issued by the State Department of Education. The State Department of Public Health is the "licensing agency" which must approve and certificate those persons who are to conduct hearing tests before they can be granted a Health and Development Credential.[3] Applicants for certificates as School Audiometrists may be granted a certificate if they have satisfactorily completed an approved course in audiometry and/or present evidence of more than two years successful testing experience in the public schools or other tax supported institution in this State. An Advisory Committee, composed of members from the fields of acoustic physics, otology, and special education, advises the State Department of Public Health regarding desirable standards for courses in audiometry, qualifications for audiometrists, and on other problems which may arise in the case-finding program.

During the past three years courses in audiometry which have been given at University of California at Los Angeles, University of Southern California, Occidental College, and San Francisco State College have been approved by the Committee. These are courses primarily designed to fulfill the requirements for teachers of lip reading; however, plans are now under way to recommend specific courses of study for persons who are to enter the field of audiometry. Courses in psychology and problems of the hard-of-hearing child, techniques in audiometer testing with clinical practice, basic acoustic physics, anatomy of the ear, nose and throat, and an understanding of the medical treatment of conditions responsible for hearing loss, and familiarity with the State Hearing Conservation Program, would appear to be desirable in the preparation of school audiometrists.

As testing is done by public health nurses working in the schools, the State Department of Public Health, through its Hearing Conservation Specialists, offers "in-service" training for those persons who are delegated the responsibility of testing hearing in addition to their other duties. This training is offered upon request and is designed to familiarize them with the latest developments, criteria, and techniques in case-finding and with the medical program for the hard-of-hearing child under Crippled Children's Services.

Careful training and further supervision of audiometer testing in the State will strengthen the over-all Hearing Conservation Program in California. Audiometrists must keep abreast with new techniques in testing, developments in the field of hearing, and be accurate in their work. In this

[2] California Health and Safety Code, Sec. 252.
[3] California Education Code, Sec. 13059.2, 16443.

way, fullest co-operation of parents, otologists, and school administrators can be assured.

The Group (Phonograph Audiometer)

Group hearing tests have been commonly conducted through the use of the phono-audiometer or phonograph record speech audiometer. It consists of a spring-driven turn table, special records of spoken numbers which diminish in intensity until the numbers are inaudible, and a group of receivers, four (4) trays of ten (10) headsets per tray. From one to forty persons may be tested simultaneously with this type audiometer. Group testing is convenient when large numbers of children are to be tested. It is a rough test with acknowledged limitations, and the results are not to be considered absolute or infallible.

Persons who conduct tests with this type audiometer should be familiar with its limitations, the methods of locating mechanical defects, the adjustment of the speed of the turn table, recognition of extraneous noises which might invalidate the tests, the accepted procedures in conducting tests, and grading of the record sheets.

This information can be learned through careful study of the directions which accompany each instrument and through reference to the syllabus published by the American Academy of Otolaryngology and Ophthalmology.[4]

Pure Tone or Discrete Frequency Audiometers

Over a period of years the pure-tone audiometer has been developed and has taken the place of the watch tick, spoken and whispered voice tests. It also serves to augment the clinical tests administered by the otologist with tuning forks. The present day audiometer is actually a series of electrically stimulated tuning forks by which sustained pure tones may be produced in varying intensities. The results of pure-tone audiometer tests give a comparison of the threshold of hearing acuity of the person tested with the average normal threshold.[5] Tests must be made with a standard instrument, one which has been approved and accepted by the National Bureau of Standards and the Council on Physical Medicine.

Persons who are delegated the responsibility of testing hearing with the pure-tone audiometer should be adequately trained in the techniques of testing, the psychology and problems of the hard of hearing, acoustic physics,

[4] Syllabus of Audiometric Procedures in the Administration of a Program for the Conservation of Hearing of School Children. Issued April, 1945, as a supplement to *Transactions of the American Academy of Ophthalmology and Otolaryngology*. Edited by Horace Newhart, M.D., and Scott Reger, Ph.D.

[5] *Bulletin of Instruction to School Authorities and Public Health Officials*, Washington State Department of Health, Conservation of Hearing Program, 1946, p. 7.

and complete understanding of the instrument. Clinical interpretation of audiograms should be the responsibility of the otolaryngologist. However, much educational and sociological guidance can be programmed for hard-of-hearing children and adults on the basis of accurate audiograms.

It must be emphasized, however, that no educational recommendations should be made without first obtaining an otological examination and diagnosis for the acoustically handicapped person.

Pure-tone audiometers may be used in "screening out" children or adults with hearing impairments. By setting the volume of the instrument at 10 or 15 decibels, a sweep check of the frequency range may be made. Those persons whose hearing acuity falls below 15 decibels (in a fairly quiet testing situation) should be retested to determine their threshold of hearing. From 20 to 30 persons may be then tested every hour by a competent audiometrist.

Threshold acuity tests should be conducted with especial care. The person being tested should be given a careful explanation of the purpose of the test, what he is expected to hear, and how he should respond. Every precaution must be taken to select a very quiet room, to make the subject comfortable and establish rapport between the subject and the audiometrist. The physical and emotional well-being of the subject must be considered; deviations from the normal may greatly influence the results of an audiometer test. Intentional malingering and/or psychological blocks or "functional overlap" may cause a test to be erroneous.

Audiometry is an art which is based on physical, psychological, and scientific facts. It can either be exacting or valueless. Audiometrists require specific training and patience. Their understanding of the acoustically handicapped as well as their knowledge of testing makes possible rapid and more exacting audiometric tests. Accurate tests made by nurses and others charged with this responsibility, aid in further development of an efficient hearing conservation program.

SPEECH AND SPEECH READING PROGRAMS FOR HARD-OF-HEARING CHILDREN IN THE SCHOOLS

Mrs. Vivian Lynndelle, *Supervisor of Speech and Hearing, Alameda City Schools, Alameda, California*

The speech correction and speech reading program integrated into a school system immediately broadens itself to embrace all phases of education of the hard-of-hearing child. How to organize and maintain such a program through remedial classes, and at the same time take advantage of all other educational facilities offered, requires thoughtful planning and the complete co-operation of the entire school personnel.

The first step in the organization of remedial classes, whether they be in centers or individual schools, is to classify cases in a given environment according to need, similarity of defect, and age. The second step is to program the classes so the children will receive the maximum amount of special instruction with a minimum amount of interruption of the daily schedule of their regular classroom work.

In grades one through five classification according to need and age is not difficult, for the children do not rotate or change classes except for special subjects. A conference with the principal or the classroom teacher is generally all that is needed to insure presentation of new subject matter at a time other than that requested by the special teacher for remedial work. When the same children must be scheduled for both speech correction and speech reading, programming becomes more complicated and it is sometimes necessary to make a choice as to which subject will be given. If such a decision must be made, speech correction should precede the lip reading.

Time periods for special work must, of necessity, be in accordance with the time periods of individual schools. Whenever possible, speech reading classes should be taught early in the day—before the children become fatigued from efforts directed to other activities. If classes must be instructed in the afternoon, the period immediately following lunch or playtime, is most favorable.

In scheduling the length of periods for smaller children, where attention span is short, thirty minutes should be sufficient. With the older children, especially those beyond the sixth grade where rotating classes work on the fifty-five minute or one hour period, remedial classes will do well to follow the period bells. The fatigue element entering into the long period of work can be avoided by carefully planned and expertly presented lessons. Should there be some feeling that a weekly period of thirty to fifty-five minutes is

insufficient time for successful teaching of speech reading, it should be pointed out that the school program of remedial classes is long range, and that children enrolled in such classes will receive instruction from kindergarten through high school. The long range program is preferable to short concentrated lessons because of the change in subject matter, vocabulary, and social situations that occur as the children grow from grade to grade.

In remedial classes where only speech reading instruction is given, age groups from five to nine work well together. Lessons must, of course, be well planned to cover familiar vocabulary and to introduce new expressions. Children, whose ages range from nine to thirteen, may work together provided specific attention is given to the capability of oral expression. Lessons must be organized to incorporate the language of home, school, playground, and community.

At the end of a year's work, new classifications and regrouping will be necessary. Readjustment of schedules to take care of beginners, and regrading of those previously instructed, is imperative. This regrouping forms one of the real problems of the special teacher, for her time schedule must remain approximately the same while division of classes is advisable. Where the number of classes and periods cannot be increased, the principle of class work must be employed. Careful selection of material and expert presentation must be substituted for individual lessons in the group already beyond the beginning stage. The beginning group must have basic work.

Beyond the seventh grade, and through high school, grouping by ages loses its importance. Grouping according to ability, general course of study, and previous training, are the important factors.

Time schedules for non-interference with subject matter can be worked out through a system of counseling, and the special teacher will plan her remedial work to meet the individual needs of the students. If an effective program has been carried on through the grades, the work in the junior and senior high schools will be along advanced levels covering specific subject matter, trade and shop vocabulary and military terms. The problem of the new student, or the newly deafened, will be carefully considered. Special attention will be paid to planning, and presenting, basic work skillfully interwoven with the vocabulary needs at high school level.

SUGGESTIONS FOR PARENTS OF HARD-OF-HEARING CHILDREN

Mrs. Katharine Sutter, *Director, Physically Handicapped, San Francisco Public Schools*

The hard-of-hearing child is not always recognized by parents or by teachers. The reason is that a hearing loss may develop so gradually that no one is aware of it, not even the child himself, and therefore nothing is done until the condition becomes serious enough to attract attention. Most problems arise when the hearing loss is great and when this loss occurs in early life. Thus, all through school this child is limited in speech and language and is confronted with many problems of social adjustment.

The parent plays a very important part in the life of the child and it is hoped that the following suggestions may be of some help to parents who have hearing problems to solve:

1. Discover the handicap.
2. Get help from available specialists.
3. Carry out the recommendations.
4. Help the child adjust himself emotionally.

How to Discover the Handicap

1. Take notice of the physical symptoms of ear trouble, which include: measles, scarlet fever, mumps, influenza, abscessed ears, running ears, frequent colds, earaches, diseased tonsils and adenoids, throat infections, sinus trouble, and mouth breathing.

2. Notice the following behavior trends:
   (a) Is the child inattentive?
   (b) Does he lack interest in conversation around him?
   (c) Does he make frequent mistakes in carrying out instructions?
   (d) Does he have faulty enunciation?
   (e) Does he mispronounce words?
   (f) Does he hold his head to one side?
   (g) Does he have monotonous speech?
   (h) Does he habitually fail to respond when questioned?
   (i) Does he request that directions be repeated?
   (j) Does he fall below standard in school subjects that are taught orally?
   (k) Does he keep to himself?

(l) Is he anti-social?
(m) Does he go to extremes to get attention?
(n) Is he belligerent or indifferent?
(o) Is he restless or chronically fatigued?

3. Give the following simple test:

Have the child stand off at 20 feet in a quiet room. Test one ear at a time and have the child cover the other ear. Have him close his eyes so that he can in no way see what you are saying. Then *whisper* numbers and words and note results.

If you suspect that your child has a hearing loss don't delay in having the ears tested. This leads to the second step, namely:

Get Help from Available Specialists

Most large school departments are equipped to give the pure tone audiometer hearing test. If not, consult the leading otologist in the community, or the local clinics or county medical associations, and have the test given.

The important thing is to get a hearing test in order to discover how great a loss the child has and in what frequencies the loss occurs. The hearing test should be followed by an otological examination and the final recommendations should be based on the medical and physical conditions as related to the findings on the audiogram, rather than solely on the findings on the audiogram.

Carry Out the Recommendations

The recommendations that follow a test and medical examination are twofold:

Medical
Educational

The medical recommendations indicate the remedial work that has to be done, such as

Removal of wax
Removal of tonsils and adenoids
Treatment for running ears, abscesses, allergies, sinus trouble.

The educational recommendations will indicate the placement of the child in a class in lip reading and the making of the necessary scholastic adjustments that go with the special program, or the recommendations may include the use of a hearing aid in addition to the lessons in lip reading.

No matter what the recommendations are, it is your job as a parent to see that your child has the best of care. Go to the school and see that your

child is enrolled in a class in lip reading. If there is no class there, find out where the nearest one is.

If your child needs a hearing aid, consult some recognized authority and let the child get some expert help in the use of the instrument. You should help your child develop such an attitude toward the use of the hearing aid that he will accept it as he does the glasses that are worn by other students.

It is important for you to remember that a hearing aid is a mechanical device and at best does not restore hearing to normal efficiency. The child needs to be taught how to use the instrument and needs instruction in speech correction and voice control.

Help the Child Adjust Himself Emotionally

The hard-of-hearing child has many problems of social adjustment. The fact that he does not hear well causes him to misunderstand people, and directions, and he is often the object of ridicule from his schoolmates. He has a great feeling of insecurity, of isolation and of extreme shyness.

The patience, cheerfulness and affection of the parent will help the child overcome his emotional problems. Show interest in your child by going to school often, by visiting the lip reading class and by seeing what goes on in the special work. Praise your child for work well done and give him every opportunity to assume responsibilities that will bring increased independence and judgment. In this way the hard of hearing child is helped to rise above his handicap emotionally and to acquire an integrated personality in spite of his handicap.

Lucky is the child who has an alert, interested parent!

THE CLASSROOM TEACHER AND THE STUDENT WITH A HEARING LOSS

CORINNE HOWE BRYCE, *Former Consultant in Education of the Hard of Hearing, California State Department of Education*

More than a hundred thousand children in the classrooms of California have impaired hearing. Estimates by the office of the Hearing Conservation Specialist of the State Department of Public Health indicate that under standard testing conditions, from 4 to 6 per cent of the total school population will show appreciable hearing losses. A hearing loss is a problem for a person of any age, but a child in school in whom this primary avenue of learning is defective, has the further handicap of being in classes where the teachers frequently do not realize existing physical defects.

Most of these children are in the regular public school classrooms. That is where they belong. Because a hearing loss tends to narrow their experience, it is desirable that pupils who are hard of hearing mingle with normal groups and be instructed with pupils whose hearing is normal. To segregate these children and further circumscribe their social and language experiences only increases their problems. Exceptions to this rule exist for a small group who have little usable hearing, and for whom remedial instruction in lip reading does not provide sufficient compensation for their hearing loss. These pupils with severe hearing impairment, should be enrolled in special day classes which provide a special and technical approach to the course of study.

Hearing losses of pupils can be detected by hearing tests given by qualified technicians at regular intervals, using a standard audiometer. If a school has no systematic testing program, it is especially important that the teachers should be able to recognize the characteristic signs that frequently develop as a result of inability to hear. If the teacher observes any two or more of the following symptoms [1] in a child, the school health office should be notified to make further investigations.

A. Variations in speech
   1. Substitution of sounds. Common errors: t for k; s for z; k for sk; and ts for s.
   2. Omission of sounds—chiefly final consonants
   3. Careless and inaccurate production of all sounds

[1] This classification of symptoms of hearing loss was developed in collaboration with Dr. Warren H. Gardner, formerly Hearing Conservation Specialist for the California State Department of Public Health.

B. Voice qualities
   1. Abnormally high-pitched
   2. Very soft
   3. Dull, monotonous
   4. Harsh, rasping, or metallic

C. Physical mannerisms
   1. Turning the head to catch sounds with the better ear
   2. Frowning constantly
   3. Straining or leaning forward to hear speaker
   4. Eyes constantly on lips of speaker rather than looking at eyes
   5. Listlessness, frequent inattention

D. Health factors
   1. Mouth breathing
   2. Severe illness with communicable disease
   3. Running ear
   4. Extreme fatigue early in day
   5. Severe and continued respiratory infections
   6. Earache (may notice cotton in ear)

E. Personality
   1. Lack of confidence
   2. Extreme antisocial behavior
   3. Extreme introversion
   4. Frequent nervousness and irritation over minor details
   5. Constantly on the defensive
   6. Great changes in attitudes following illness

F. Achievement
   1. Two or three years behind age level in school
   2. Sudden failure following severe illness

Classroom Instruction

Pupils having a significant hearing loss must have certain allowances made for their physical defects. The necessary allowances and adjustments can easily be made by any classroom teacher who is sincerely interested in children. For pupils whose handicap is appreciable, but not so severe as to warrant remedial or special class work, the classroom teacher can often provide just that element of simple consideration and help which is needed to offset their handicaps and allow them to work at full capacity.

The following suggestions are offered for guidance of the elementary or secondary teacher who has pupils with hearing losses of any appreciable degree.

A. Physical adjustments for the child
   1. Seat the individual near the front of the room.
   2. Ascertain that his better ear is toward you.
   3. Learn the range of his hearing.
   4. Always have the child seated with his back to the light.
   5. Be sure there is good light on your face to aid him in reading your lip movements and facial expressions.
   6. Allow him freedom of movement in his seat. During discussions he should be allowed to turn and watch the face of the speaker.

B. Personal modifications for the teacher
   1. Speak naturally.
   2. Use a normal tone and rhythm of speech.
   3. Do not exaggerate speech movements.
   4. Use complete sentences.
   5. Reword or rephrase commands or requests not understood. (The key word of the sentence is often not easily "seen.")
   6. Shape all speech sounds completely. (Fully shaped vowels and clearly articulated consonants are of great assistance to a lip reader.)
   7. Let your entire face be expressive.
   8. Keep hands and books away from face.

C. Attitudes of teacher
   1. Remember that these children have normal intelligence. Only their experiences are limited.
   2. Expect normal behavior—neither protect nor push.
   3. Develop good relationships with these children. Be interested in their hearing problems.
   4. Learn if possible, what has caused the hearing defect.
   5. Learn how the children feel toward their hearing loss. This will enable you to help them to adjust socially and educationally.

D. Teaching techniques
   1. Always be sure that the child understands the subject matter being discussed. If clarification is not made at the beginning of the lesson, it may be several minutes before the hard-of-hearing student discovers the topic under discussion.
   2. If at all possible, give new vocabulary words before the lesson is presented in class.

3. Modify or adapt spelling tests so that if the child is depending to a great extent upon lip reading, he can tell by the context of the sentence whether you are giving the word "fan" or "van."
4. Since a hearing impairment is a defect which tends to affect language mastery, the child should be encouraged to compensate by active participation in language activities.
5. Explanations made at the blackboard are frequently difficult for children to hear, who are depending in some degree upon lip reading. Be sure to draw the figure, or to write the example or the sentence, *before* explaining the illustration to the class. Then face the class and make the explanation.
6. Give the child opportunity to participate in group activities, such as singing in the verse choir, and taking part in original plays.

E. Discipline

1. Assure the child with a hearing defect that he will not be reprimanded should he fail to hear his name called.
2. Do not be overlenient with a child because he cannot hear, but do not punish without determining whether or not he heard the instructions.

F. Lip Reading Games

1. Make sure the child who has a hearing loss is aware that he can look at a person's face and "see" much of what the person is saying. By noticing whether the child looks at your lips when you speak, you can determine if he has discovered this technique. Always encourage the child to be attentive to facial movements. The reading of speech is an entirely new idea to some children.
2. Exercises in informal lip reading are valuable.
   a. A lower grade teacher used this motivation for lip reading:

      "Class, you have two eyes that you use to read what is written in a book and what is written on the blackboard. Now I am going to see how good you are at reading my lips. You see, I am going to say something, but I am not going to use my voice. You are to see if you can see or read your name on my lips. First, I will show you how Barbara Brown's name looks on my lips. Can you see it? Good! Will you please stand when you see your name? Now we will begin. Ready with the eyes."

   b. Middle and upper grade children profit from this variation:

      "You have done a great deal of reading since you entered school, but I don't know that you have ever done this kind of

reading. Have you ever read a person's lips and speech? Well, let us see how well you can do this kind of reading. I shall describe something in the room, beginning with the words 'I see something red, white, and blue.' Can you read what I have said? The flag is (red, white, and blue). Good! Now Jane, you may come to the front and describe something in the room."

Remedial Instruction

Children tested and found to have a specified hearing loss should be referred to an otologist for examination and recommended treatment. The criterion for referral specified by the Office of the Hearing Conservation Specialist of the California State Department of Public Health is (1) the loss of 20 decibels in any two tones of the standard audiometer or (2) the loss of 30 decibels in any one such tone.

Treatment by a physician can rectify about two-thirds of the referrable cases of hearing impairment if treatment is prompt.[2] However, at least one-third of the cases cannot be helped medically except through the prevention of further impairment. In addition to enlightened consideration by regular teachers, these pupils should have remedial instruction for several hours each week. Some of those with severe impairments may require full-time instruction in a special class of pupils with similar difficulties.

Remedial instruction includes lessons in lip reading, auricular training, speech and voice correction, and practice in the use of amplifiers. It should be accompanied or followed by vocational guidance. Benefit from such instruction is seen first in improved social attitudes. There may be no immediate change in the scholastic record. It may take two or three years for the educational retardation to be overcome.

Remedial classes are instructed by specially trained personnel who usually make a point of consulting with the classroom teachers and demonstrating remedial techniques. Such demonstrations increase teachers' understanding of the ordinary classroom procedures which they can carry out to aid their hard-of-hearing pupils. The following is a brief outline of information concerning remedial instruction and guidance which should be understood by classroom teachers in elementary and secondary schools:

A. Lip reading (a process of understanding what is said by another person by observing cues such as movements of facial muscles, particularly the lips—also called Speech Reading)

[2] Estimate by Donald R. Caziarc, Hearing Conservation Specialist, California State Department of Public Health.

1. Factors in learning
   a. Only a small proportion of the movements of speech can be readily seen.
   b. Many words appear identical in conversational speech, such as *man, pan,* and *ban.*
   c. The technique of reading the lips is difficult to learn in less than a year.
2. Criteria for assignment to remedial classes
   a. Any child referred to an otologist is a possible candidate for assignment to remedial classes
      (1) if the prognosis is grave and his scholastic record is poor;
      (2) if the prognosis is good but his school performance is failing;
      (3) if the diagnosis is progressive deafness (in this case immediate assignment is necessary).

B. Speech correction
   1. The classroom teacher should notice whether the hard-of-hearing child is carrying over his speech errors into reading and spelling.
   2. Duration and severity of loss greatly affect the student's ability to acquire a new, corrected pattern of speech.

C. Auricular training (stimulation and training of the auditory and tactile sense organs by sound vibrations produced by the voice or by sonorous instruments—also called Acoustic Method).
   1. Auricular training may be given with or without a hearing aid.
   2. Auricular training is extremely important if a child uses a hearing aid.

D. Hearing aids
   1. Attitude. The teacher should
      a. Accept the aid completely, as comparable to eyeglasses for other pupils.
      b. Show an interest in the device. Have the child explain how it works. Ask him when he finds the instrument the most helpful, and when the most difficult to use.
      c. Remember that a hearing aid does not usually restore hearing to normal efficiency. This is particularly true when it is first used.
      d. Condition the class to a similar understanding.
   2. Classroom use of hearing aids
      a. The pupil has probably been instructed to wear the instrument at first for short periods of time in quiet situations. Help him to do so the first week he wears the aid at school.

b. During the introductory period, good listening experiences are necessary for the pupil. Such quiet situations occur in school during the story hour, spelling dictation period, reading lesson, penmanship period, and discussion period.

c. If the child's hearing loss is considerable (30 decibels or more) and of some duration, his first reaction will be: "There's so much noise!" After he has identified the usual gross school sounds, he will begin to recognize the finer speech sounds.

d. Loud shouts, dropped books, slammed doors, and clapped hands, greatly amplified by the hearing aid, can be unfortunate and painful experiences for students wearing amplifiers. Practice is required to master adjustment of volume control and to minimize discomfort.

e. The aid should be attached to a belt of Sam Brown type for boys, and an apron of pinafore type for girls, in order that it may be easily slipped on and off. It should be left in the classroom during recess and play periods.

f. A hearing aid is a mechanical device. The wearer and his teacher should be prepared to have it cease to function entirely, or partially, without warning.

3. Physical factors for the wearer

a. Wearing a hearing aid is not the most comfortable or pleasant experience. If the child protests seriously regarding the aid, it is wise to investigate the cause and report to the parents, rather than insist that he continue to wear the aid.

b. Physical conditions (respiratory infections, fatigue) will affect a student's ability to hear with a hearing aid.

E. Guidance

1. All pupils with hearing defects should have careful counseling on their school programs. Frequent checks should be made with these students to prevent failure.
2. Choice of vocation or profession should be made on the basis of the student's (a) interest, (b) ability, and (c) physical capacity.
3. Pupils with a hearing loss should not be guided into vocations in which normal hearing is a requisite.
4. Hard-of-hearing students should realize that they must have thorough preparation and training to succeed in their chosen vocations.
5. Services of the Bureau of Vocational Rehabilitation are available for hard-of-hearing persons over 16 years of age.

In California during the year ending June 30, 1946, there were 2,094 pupils from kindergarten through the 12th grade in remedial or special classes for the hard of hearing. Although 75 teachers in the State hold the special secondary certificate to teach lip reading to the hard-of-hearing child, only 41 were reported as teaching such classes during 1945 and 1946. These figures for teachers and enrollment represent an increase of over 80 per cent during the biennium 1944-1946, but there are still many thousands of hard-of-hearing students in California who are not receiving remedial class instruction to offset their handicaps. As a result, the educational achievement of these pupils continues to be below their capacity of performance.

Until preventive and corrective programs for the hard-of-hearing pupils are more widely established and more liberally supported, the classroom teacher must continue to be the major source of help and encouragement to these handicapped young people in their adjustment to school opportunities.

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OTOLOGICAL DIAGNOSTIC CLINICS OF CALIFORNIA

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The success of an otological diagnostic clinic depends upon the preparatory work done by audiometrists, school nurses, and their assistants. If it were not for such methodical testing and screening, few cases of hearing defects among school children would be brought to medical attention at an early date. The otologist will naturally appreciate this valuable contribution, but he can do more: he can give encouragement and aid to these co-workers by praising their services so that they will be duly appreciated by parents and lay assistants. Thus, an enthusiastic spirit of co-operation can be developed which will act as an incentive to all who participate in this work.

Standards for Referral

The standard by which children are referred to an otological diagnostic clinic has been established by an advisory committee in which the California State Medical Society, Section of Otolaryngology, was represented by several members. Examination by an otologist is recommended whenever preliminary screening tests revealed any of the following hearing losses:

1. A loss of 20 decibels in one or both ears in any two frequencies between 128 and 8192 cycles.
2. A loss of 30 decibels or more in any one frequency.
3. A mild hearing deficiency with concomitant signs of a pathological condition which might result in progressively more severe loss of auditory function ("common sense referral").

These referral criteria have been developed from the experience of otological practice; and suggestions for changes or improvements of these present standards are invited.

No other single factor contributes so much to the success of an otological diagnostic clinic as the presence of one or preferably both parents while the child is being examined. Advising the parents to this effect is part of the valuable spade work performed by the school nurse and her assistants. The child's history can then be taken by a nurse or lay assistant who inserts the parent's answers to her questions in the history sheet. It is easy for the otologist subsequently to complete the otolaryngological history according to his findings.

Thereafter, the parents watch the recheck test by means of a pure-tone audiometer and the otological examination performed by the doctor. If the

parents are present while the child goes through the different steps of audiometric and otologic procedures, they will be impressed by the purposeful and efficient routine which they are witnessing. In this manner, the greatest danger to the success of any hearing conservation program can be largely avoided, namely the failure of the parents to follow up the examination and diagnosis by providing prompt care for the child's hearing defect. It is most important that the doctor should immediately discuss with the parents the audiometric findings, and various psychological and sociological aspects of deafness, as well as the medical and surgical care required by the child. If such a course is followed, the parents rarely fail to comply with the otologist's recommendations. In the words of an outstanding nurse, in charge of one of the most successful hearing clinics in California, it is necessary to stress "the quality of the examination and the explanations to the parents rather than the number of children examined."

The examining otologist should also watch for signs of speech defects in the patient. At times, speech correction, special seating in the class room, lip reading, the use of a hearing aid, or auricular training may be indicated.

Aids to Routine Examinations

A few simple hints will perhaps aid in the efficient performance of the various routine examinations:

1. Several lay assistants should be on hand to help the nurse and the audiometrist. Much of the doctor's time can be lost in waiting for the patient to be prepared for him, or in the ushering in and out of child and parents.
2. During the course of the examination the physician dictates brief notes to a lay assistant who, after a few cases, is usually able to write out in long hand the findings and recommendations. Whenever possible, these lay assistants should be prominent persons in the community, as for instance, officers of the local parent-teacher association. They will be greatly impressed by the skill and thoroughness of the examinations, and soon become staunch supporters of the Hearing Conservation Program. Once an otological diagnostic clinic has been properly started and conducted, the interest of the lay assistants and of the school personnel will not permit it to die.

Whenever an otologist, approved by the committee representing the California State Medical Society, Section of Otolaryngology, is available in the community, he should be called upon to perform the specialized examinations; if one or more such otologists practice in the community, a rotating schedule for service in the clinic should be arranged. At the start of a new

otological diagnostic clinic the assistance of an otologist with previous experience in conducting such clinics will prove helpful.

As the otologist is paid not only for mileage and other expenses, but is also compensated for his time through special state appropriations, his work at the otological diagnostic clinic does not constitute a charity. Furthermore, fully 80 per cent of the examined children will require special medical or surgical care. While in the great majority of cases the child will receive further treatment as a private patient, the Crippled Children's Service will arrange for needed care whenever the family is unable to pay.

Equipment for a Traveling Clinic

Only minimum equipment is required in order to conduct an otological diagnostic clinic, and oftentimes the instruments which the otologist usually carries in his out-call bag will adequately meet the needs. The following list has been compiled in order to convey an idea of the equipment and instruments necessary for a traveling clinic.

1. A table on which to place instruments. Part of this table may be used by the lay assistant when taking notes.
2. Four chairs—one each for patient, parent, doctor, and assistant.
3. Light source—such as drop light or goose-neck desk lamp.
4. Washing facilities for hands and instruments.
5. Head mirror.
6. One pint of 70 per cent alcohol.
7. A container filled with 70 per cent alcohol in which used instruments can be rendered relatively sterile.
8. Paper towels.
9. A small pack of sterile cotton.
10. Finger cots for digital examination of nasal pharynx.
11. Wooden tongue blades.
12. 4 x 4 sterile gauze sponges.
13. One per cent ephedrine sulphate in normal saline—one ounce; to be used for shrinkage packs.
14. Ear specula—approximately one dozen of various sizes.
15. Metal applicators—one-half dozen.
16. Nasal specula—one-half dozen.
17. Postnasal and laryngeal mirrors—approximately one dozen of various sizes.
18. Cerumen curettes—approximately one-half dozen of various sizes.
19. Bayonet forceps—approximately one-half dozen of various sizes.
20. Cerumen syringe.

21. Emesis basin.
22. A pure-tone audiometer.

More equipment and other ear, nose and throat instruments may be desirable, especially if the clinic is to be more or less permanently conducted at the same location. Special chairs, stools, cabinets, lights, sterilizers, as well as positive and negative pressure would considerably help to increase efficiency. But it must be remembered that a hearing clinic of this type is only intended to serve diagnostic purposes, while all treatment is conducted privately by the otologist at his office or at a hospital.

Forms for the patient's history as well as audiometric and physical findings (HC 1-4) are furnished by the Bureau of Maternal and Child Health of the Department of Public Health in San Francisco. The records should be completed by the nurse and lay assistants. One copy is filed with the child's health record at his school, while the others will eventually reach the treating physician, the local health department, and the Hearing Conservation Specialist, State Department of Public Health, to be used for follow-up and statistical purposes. These records will also furnish the basis for securing adequate appropriations from the legislature in order to sustain and expand the Hearing Conservation Program.

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VOCATIONAL REHABILITATION AND EMPLOYMENT

BLUETT, CHARLES G. "A Problem in Vocational Rehabilitation—The Story of T. D. Who Would Not Adjust," *Volta Review*, XLIV (April, 1942), 225-6.

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BRIDGES, CLARK D. *Job Placement for the Physically Handicapped*. New York: McGraw Hill Book Co., 1943.

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Dictionary of Occupational Titles and Codes, Parts I and II. Washington, D. C.: The Job Analysis and Information Section, Division of Standards and Research, 1939.

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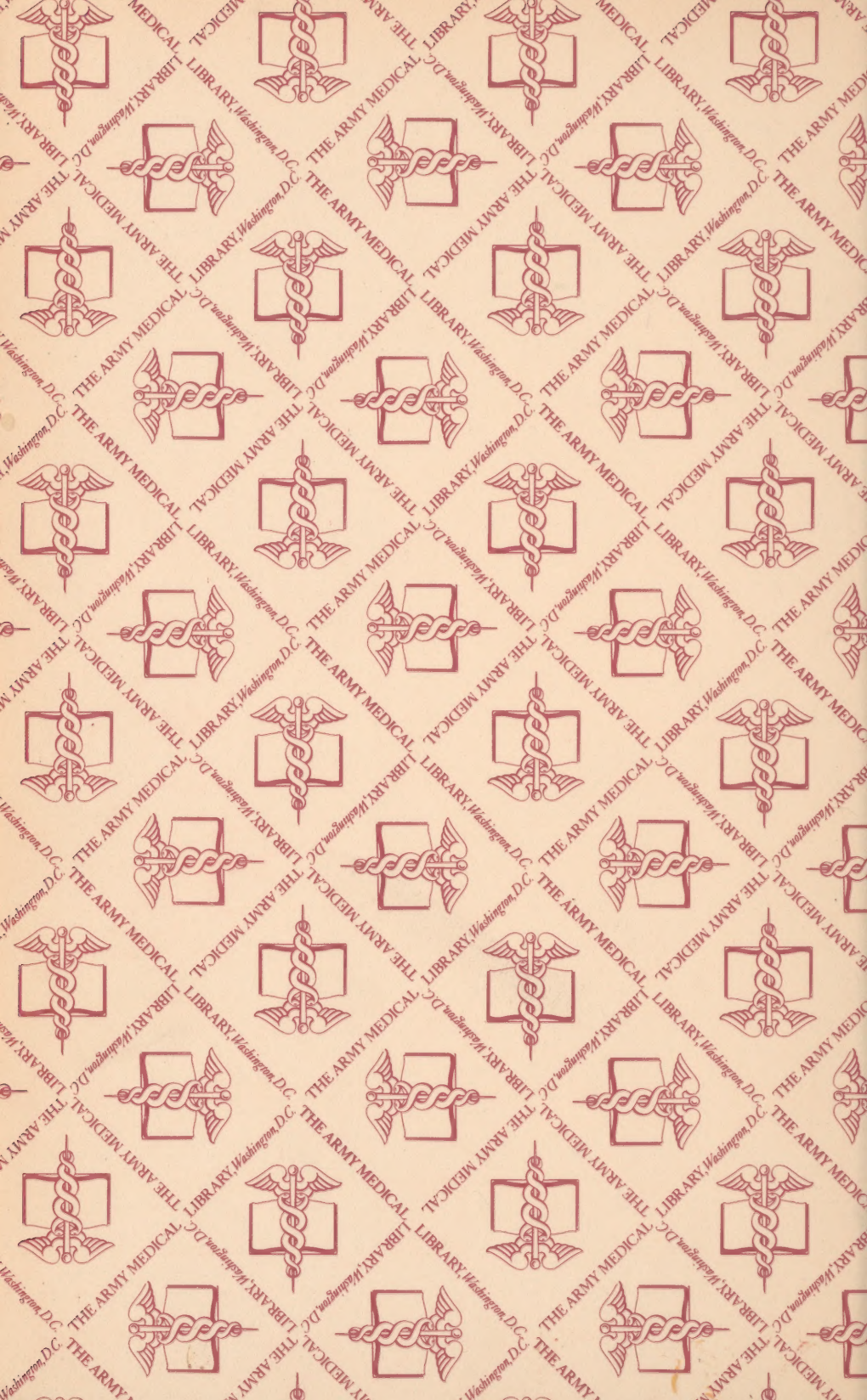
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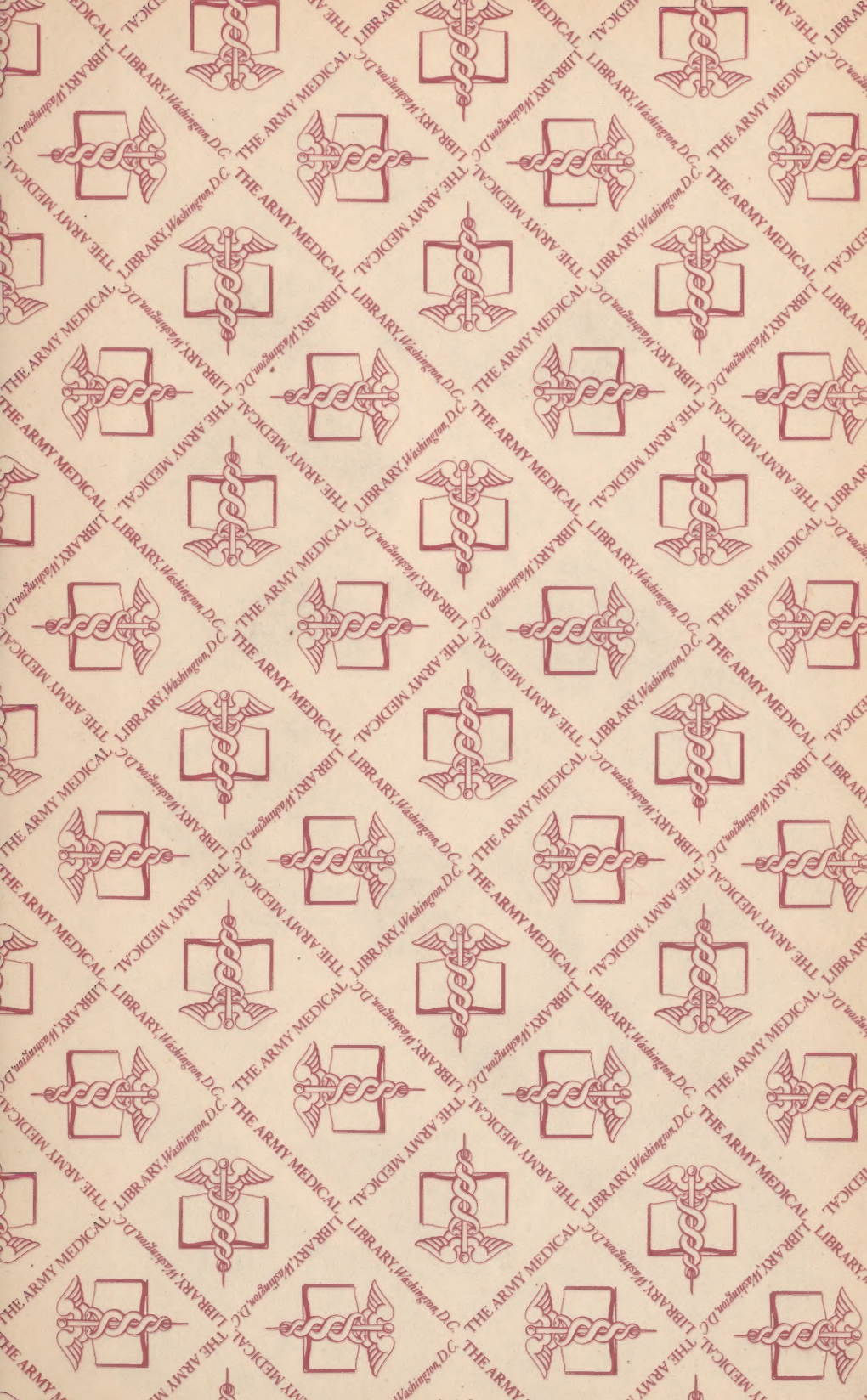
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